THE IRON AGE

New York, Thursday, March 17, 1910.

A Notable Gas Engine Installation.

The Tod Gas-Driven Blowing Engines at the Carnegie Steel Company.

The largest gas-driven blowing engines in operation in America are the four installed at the Ohio Works of the Carnegie Steel Company, at Youngstown, Ohio, by the William Tod Company, Youngstown, Ohio. A view looking down on the installation is given in Fig. 1, while the side view of an engine in two parts is shown in Figs. 2 and 3. The engines operate with furnace gas and furnish the blast for furnaces Nos. 5 and 6. Three engines are ordinarily in service, with one held in reserve.

Each engine has a rated capacity of 40,000 cu. ft. of free air per minute, against 18 lb. blast pressure when operated at 59 rev. per min., but operate satisfactorily up to 75 rev. or above. The engines are of the twin tandem type, with opposed air cylinders.

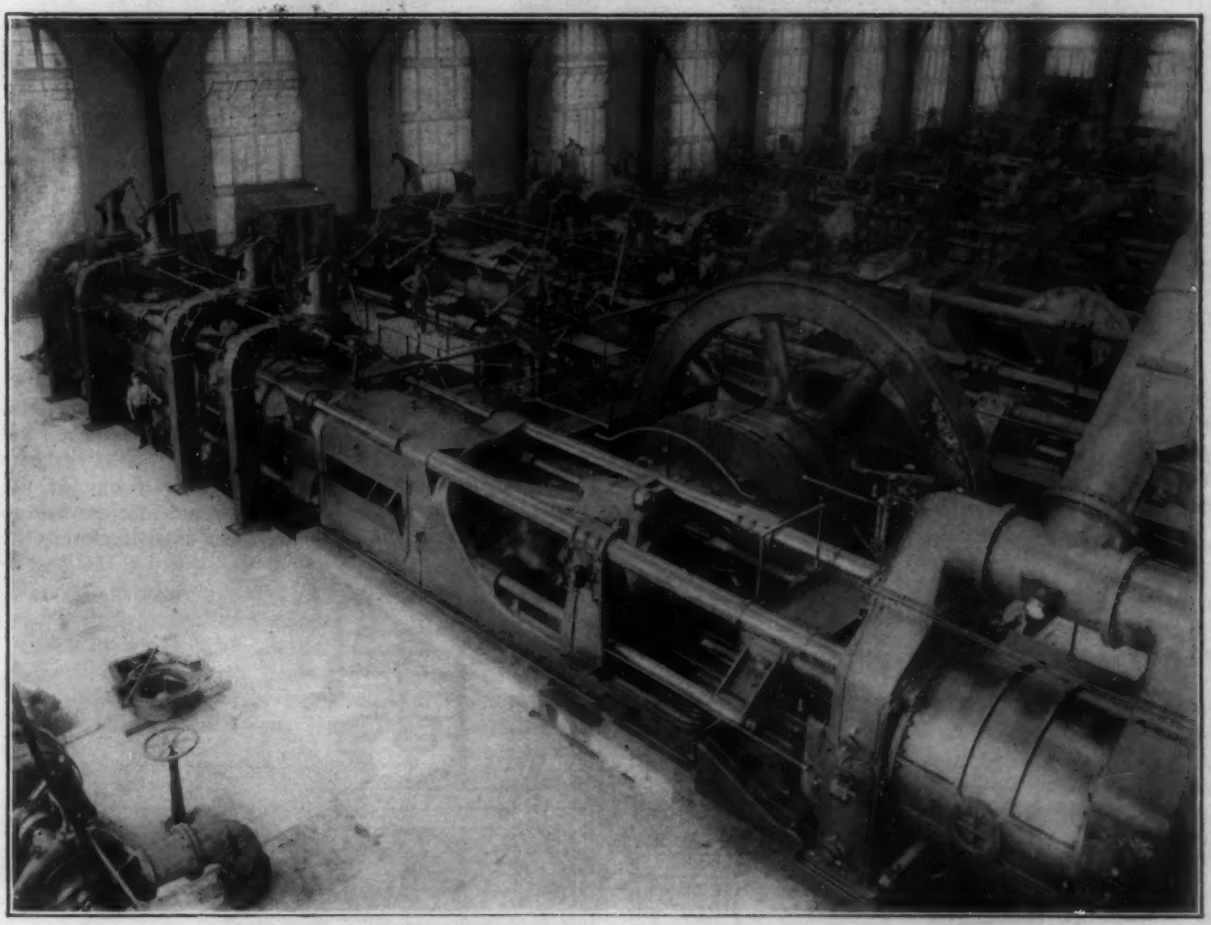


Fig. 1.—Three of the Four Gas-Driven Blowing Engines at the Ohio Works of the Carnegie Steel Company.

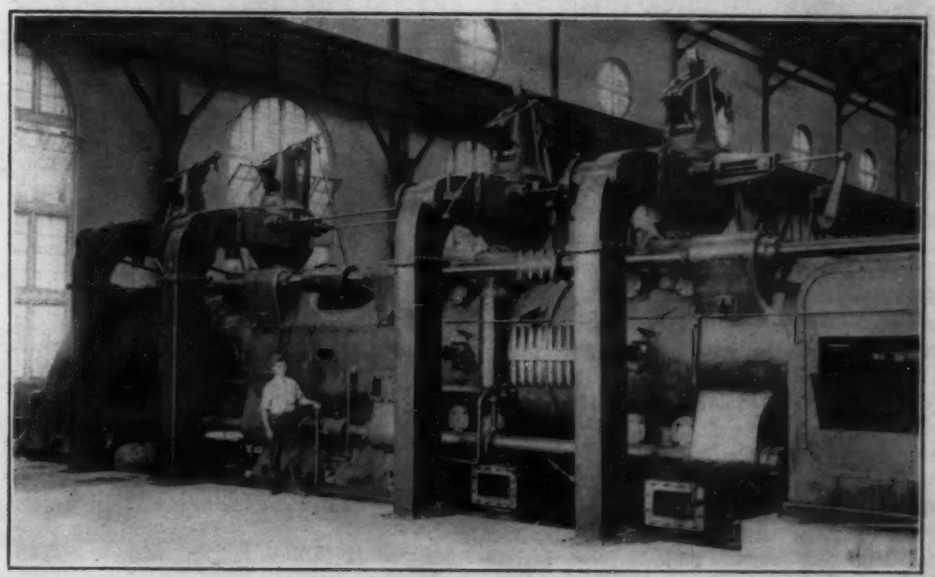


Fig. 2.—Side View of One of the Engines at the Gas End.

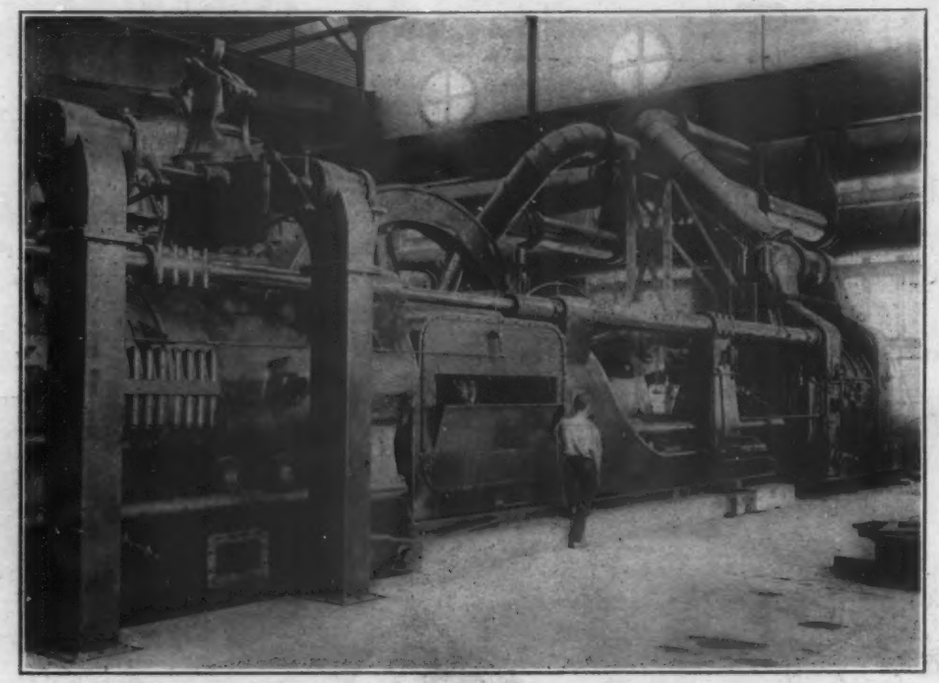


Fig. 3.—The Same Engine from the Same Side but Bringing in the Air Cylinder End.

Each engine has four double acting gas cylinders, 42 in. in diameter by 60 in. stroke, and two air cylinders 80 in. in diameter by 60 in. stroke. Each engine is fitted with a flywheel 24 ft. in diameter, weighing 75 tons. The length of the engine is about 100 ft. and the total weight about 1000 tons.

The engines operate on the four-cycle system. The gas valve gear is of the usual Tod design. The inlet and exhaust valves are operated by a common eccentric and no cams or tripping mechanism are employed. The gear is of the constant compression, constant mixture type and insures a properly proportioned explosive mixture at the igniters under all loads. On account of the low heat value of the gas three igniters are provided for each end of each cylinder. These igniters are operated by solenoids.

The air valve gear is of special design, as the speed required for the economical operation of the power end is much greater than is usual in steam blowing engine practice.

The general arrangement of the air cylinder and gear is shown in Fig. 4, from which it will be seen that no radical departure has been made from designs which have been applied in the steam blowing engines built by the Tod Company, although modifications have been introduced which effectually overcome the difficulties due to high speed. A special feature of this valve gear is the unloading device, by which in case of overload, due to excessive blast pressure or other causes, the air cylinders may be unloaded to any desired degree, the speed of the engine remaining normal or being increased or decreased at will. This result is accomplished by the separate control of one of the main inlet valves, which can be caused to close at any desired point in the piston stroke; until it closes, the air in the cylinder does not begin to be compressed. A graduated index shows at all times the effective displacement of the air pistons.

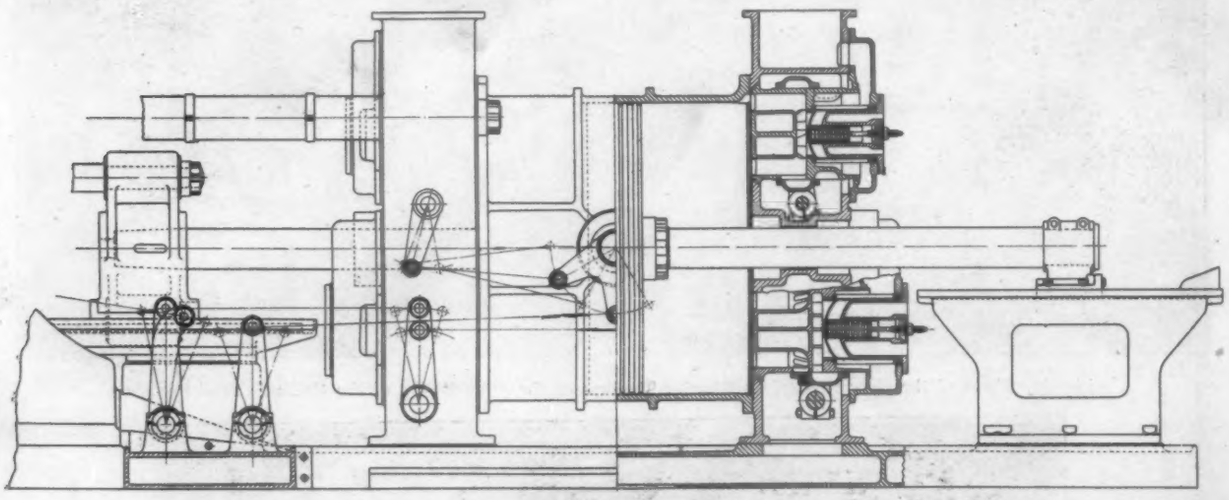


Fig. 4.—Detail of the Air Cylinder and Its Valve Gear.

This method of control is particularly valuable on gas blowing engines, as the overload capacity of a gas engine is limited within rather narrow range, while the blast pressure on the furnace may fluctuate widely. Without a device of this kind it would be necessary to make the air cylinders small enough to insure that, when operating under the poorest conditions, the gas end would have sufficient power to drive the air end

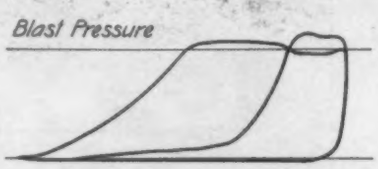


Fig. 5.—Two Superimposed Indicator Diagrams from the Air Cylinder.—Full and Part Displacement.

against the maximum blast pressure. This would mean that under normal conditions the load on the gas cylinders would be much too light for best economy. With the unloading device the air cylinders are made as large as the gas cylinders can drive under the most favorable conditions—*i. e.*, with the lowest normal blast pressure and the highest mean effective pressure in the gas cylinders, a condition conductive to the highest efficiency. If for any reason it is necessary to partially unload the air cylinders, no loss either in economy or capacity results, as the gas cylinders are loaded to their economic maximum, while the air capacity is made up by increased revolutions.

The indicator diagram, Fig. 5, shows two overlapping cards, one taken at practically full displacement and the other at part displacement. Any percentage of displacement desired between these two cards can be obtained by simply adjusting a hand wheel without slowing down the engine or interfering with its operation in any way.

The first of these engines was placed in operation in May, 1909, and the last in October, 1909, since which time three engines have furnished all of the blast for two 600-ton furnaces.

Tests of a Manganese Steel Safe.

Safes are intended to protect against fire and theft. They differ little in ability to resist fire, but the strongest against thieves are those of the best material and design. Manganese steel appears to be the best material. It is fairly hard and exceedingly tough, and practically impossible to machine. A diamond-pointed drill run at high speed will in time pierce a manganese steel slab, but ordinary drills make no impression on it. There is thus slim chance of introducing an explosive, and even the effect of the latter may be limited, as was shown by a test made at the works of the Ely-Norris Safe Company, Perth Amboy, N. J., on January 21, 1910, before a committee representing a Western interstate bankers' association. This committee selected an

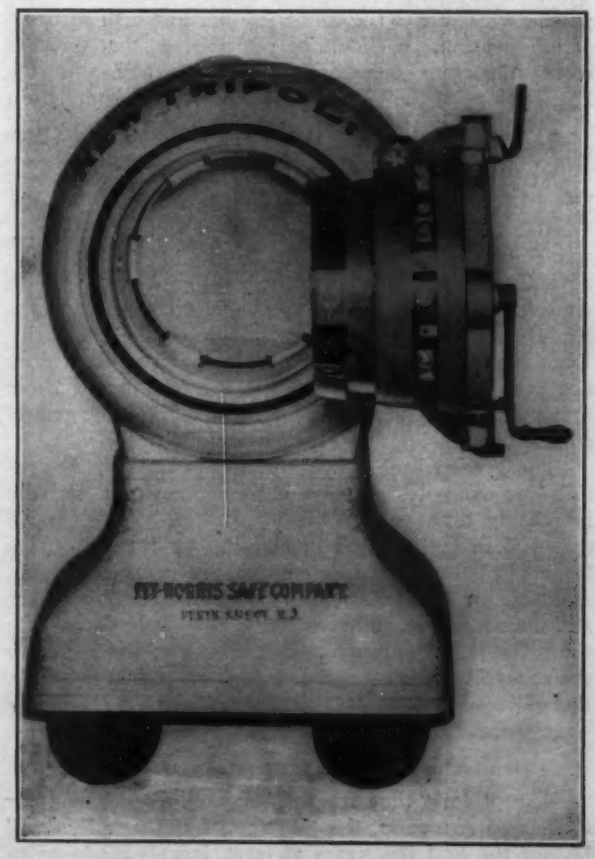


Fig. 1.—The Manganese Steel Safe Built by the Ely-Norris Safe Company, Perth Amboy, N. J., Before Testing.

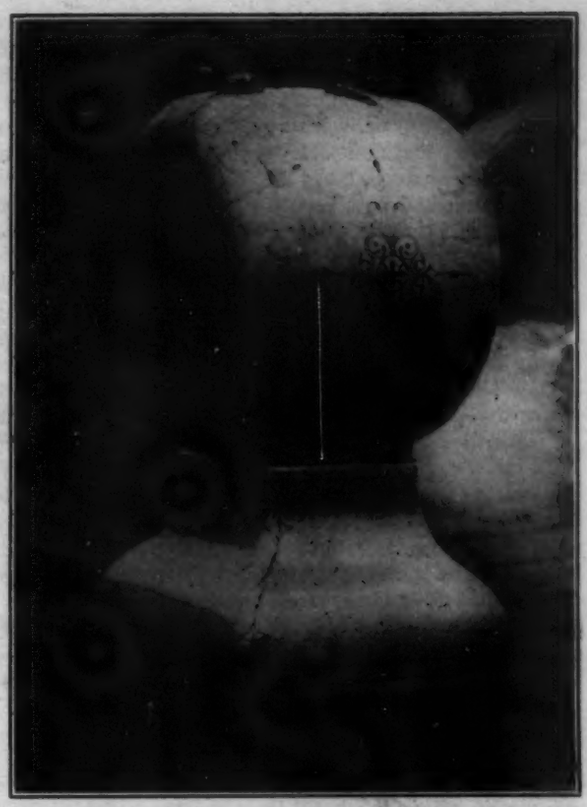


Fig. 2.—Tenth Explosion of Charges of Nitro-Glycerine Without Serious Effect on the Safe.

expert, who was permitted to make numerous attacks with nitroglycerine upon a finished safe ready for its purchaser. There is probably but little difference in the castings of Manard manganese steel supplied by the Pennsylvania Steel Company and it had been intended to use a safe that had not been painted nor completely finished, but the suggestion that this might be better than the average led to the selection of a safe of the committee's own choosing, shown in Fig. 1, weighing about two tons. Fitted with the combination mechanism and the automatic locking and unlocking device, its price is $1600.

The safe proper is of the form of a flattened sphere. The door is a huge plug or bung and fits into the opening with a ground joint which is scarcely discernible. The bolts controlled by the combination and the automatic locking device are not depended upon to hold the door shut. That is accomplished by a system of interlocking lugs, the bolts serving to prevent rotation and consequent disengagement of the lugs. The safe consists of two castings, the body and the door, and an attack on the steel sphere must be made through a wall having a minimum thickness of about 3 in. or by way of the door. Stripped of fittings, the door consists of an external slab about 2½ in. thick and an internal one about 5 in. thick, connected by heavy sections of metal, the whole being one casting, except for the bolts imbedded in the door and the manganese steel spindles belonging to the combination device. The space between the slabs not occupied by the connecting webs is partly taken up with the apparatus of the combination.

The obvious line of attack is by way of the joints and the point selected on the present occasion was on the line between door and body a little to the right of the top. Here an oblong cavity was made with a hammer and chisel and ½ oz. of nitroglycerine exploded in it. The joint apparently was not sprung at all. Upon exploding a second charge of 1 oz. a very slight widening of the joint, 0.002 in. possibly, on each side of the indentation was observed. The hammer and chisel were again used and a third charge, also 1 oz., exploded. The wedge-like indentation made by the

chisel had a maximum width of about 3-16 in. before this explosion. The crack on the side of the broad part of the wedge was widened, being now about 0.004 in. and extended for perhaps 3 in. on this side. Charges of 1, 1¼ and 1½ oz. were next exploded in succession, the crack on the blunt side of the wedge increasing to approximately 0.008, 0.015 and 0.027 in. in width. The opening that had now been made extended for perhaps 5 in., with possibly some reduction in its width for part of the distance.

Apparently, the way into the explosion chamber back of the front plate was now open, for after firing the seventh charge, consisting of 2 oz., the protrusion of the front plate was observed to be general and not local. The connecting lugs, holding the front and back plates together, had, no doubt, stretched somewhat and permanently. Charges of 3, 4 and 5 oz. were exploded successively and the door then protruded considerably, but not evenly. For some reason the top and one side protruded much less than the bottom and the other side, but the maximum protrusion was only about 3-16 in. Fig. 2 shows the safe at the time of this last explosion. Four charges of 7 oz. each were now exploded in succession, and the maximum protrusion increased to about ½ in. A final charge of 8 oz. was now discharged, but with practically no increase in the displacement. In the last nine attacks, in which the nitroglycerine seemed to have been advantageously placed, a total of 50 oz. was consumed.

Even if it were possible to blow the front plate completely off, as has been done, the inner slab of solid manganese steel, 5 in. thick, would still remain, held in its tapered hole by the interlocking lugs. To disengage these, the door must be rotated and the bolts of the automatic time device would prevent this.

The Scullin-Gallagher Iron & Steel Company.

In connection with an offering of a portion of the $600,000 first mortgage 5½ per cent. bonds of the Scullin-Gallagher Iron & Steel Company, St. Louis, a statement of President Harry Scullin dated February 9, 1910, is published. The plant is spoken of as the largest individual steel casting plant in the world. Mr. Scullin says: "The capital stock has just been increased from $750,000 to $1,500,000, the increase being paid for in cash, which, together with the proceeds derived from the sale of $600,000 bonds will be used to take up the floating debt and to furnish sufficient additional working capital to carry on our steadily increasing business. It is not our intention to issue any additional bonds, so that in all probability the $900,000 bonds of this issue held in escrow may never be sold. The company's properties occupy 80 acres, located between the Missouri, Pacific Railway and the St. Louis & San Francisco Railroad, about 5 miles from the heart of the city. The buildings, all modern, steel and brick, cover an area of 275,000 sq. ft. A fully equipped pattern shop has just been added. The power house equipment is most modern and more than sufficient for the production of all electricity and compressed air needed. The net profits for the five years prior to January 1, 1910, were $541,102, or an average net earning of $108,220 per year, which is equal to three times the interest on these $600,000 of bonds. This period includes 1908 and 1909, two most unfavorable years. By the introduction of labor-saving machinery, the capacity of the plant has been so largely increased that I consider it more than conservative to estimate that our earnings during the next five years will show an increase of 100 per cent., which will make our annual net earnings over six times the interest on these bonds."

The exports of steel rails from Belgium in 1909 were 111,429 metric tons, against 118,852 tons in 1908 and 153,694 in 1907. The largest amount to one country last year was 24,342 tons to Brazil, against about 25,000 lb. to Brazil in 1908.

The Trans-Andine Railroad Completed.

Valparaiso and Buenos Aires Linked Together.

BY THADDEUS S. DAYTON.

Valparaiso, the commercial center of the copper and nitrate interests of Chile, is a seaport whose commerce approaches that of San Francisco in importance. On the other side of the continent, within the same geographic parallels, is Buenos Aires, the metropolis of Argentina and the largest city in South America. Between them rises the giant wall of the Andes, which hitherto has effectually separated the two countries and the two coasts from a free interchange of their land-borne commerce. In Argentina there are vast plains rich in cattle, corn and wheat. In Chile are inexhaustable deposits of nitrate of soda and an incalculable amount of copper and other mineral treasures. A great new railroad, the first transcontinental highway of steel in the southern hemisphere, has now joined these two cities on the Atlantic and Pacific oceans for the first time.

From Ocean to Ocean in 29 Hours.

Until the completion of this line—the Trans-Andine Railroad—Valparaiso and Buenos Aires were a week apart overland and from 10 days to a fortnight distant by water via the Straits of Magellan. When the Trans-Andine is formally opened for traffic, which was to be March 15, passengers can cross the South American continent between these two important seaports in 29 hours, and for the first time a quick and free interchange of the products of Chile and Argentina will be possible.

The Trans-Andine Railroad is a pigmy compared with the great transcontinental systems of the United States. It is but 880 miles in length from coast to coast, but its completion means the beginning of an era of unprecedented development for the lower half of the South American continent. Not only that, but it will also have a great influence in the commercial impulse it will give to the countries that lie north of Chile and Argentina. It should be remembered that Chile is more important commercially to-day than was the Pacific slope of the United States before the completion of the first of the North American transcontinental railroads.

At first the principal freight traffic westbound will by cattle and wheat from Argentina to Chile, but the opening of this quick route overland will also cause a tremendous expansion of the trade between all the agricultural countries on the east coast of South America and the long, narrow, arid strip between the Andes and the sea on the west side of the continent. Each region has natural resources that the other does not possess, and it is from the interchange of these that the Trans-Andine Railroad will derive a large and steadily increasing share of its freight traffic.

The great wheat farmers of the pampas of Angentina, for example, will take a tremendous and steadily increasing tonnage of Chilean nitrates. They are an essential in fertilizing and building up the soil. The large agriculturists of Argentina are progressive and scientific in their methods. Though their lands are still naturally rich and productive, they have found that the nitrates not only make them more so but conserve their fertility. Nitrates and the other products of Chile therefore will move east and across the Andes in exchange for cattle and foodstuffs.

How the Railroad Will Stimulate Trade.

Except for "time freight" from Europe bound for Chile and Australia, the tonnage of the new line will be, for the first few years at least, largely made up of South American products. In this respect alone, however, a tremendous amount of traffic will be created, as

is always the case with the opening of any important line of communication. The development of the vast region that is tributary to this transcontinental railroad will mean that machinery of all sorts will be needed. New agricultural, mining and industrial interests will spring up and flourish. All of these will have to be supplied with manufactured iron and steel products from America or Europe. The statistics of five years hence doubtless will show a business expansion in that part of South America such as has never been known before. Even now new railroads are being planned. One of these projects is to build another transcontinental railroad several hundred miles to the northward of the Trans-Andine, crossing the mountains by a pass that has been discovered recently. Surveyors are laying out the route now.

While the Trans-Andine Railroad will be of inestimable benefit to Chile and Argentina in promoting their intercontinental and domestic commerce, still greater benefits will accrue to both countries as regards their international relations. The inhabitants of both come from the same Spanish stock and speak the same language. They are somewhat like New Englanders and Canadians in their business relations. The Chileans, by the way, are called the Yankees of South America.

The Trans-Andine Railroad will shorten the distance between western Europe and Australia by about 1000 miles and effect a saving of about nine days in its connection with Europe, and the journey from Chile to the Eastern ports of the United States will be materially shortened.

Rivers Hitherto Supreme as Highways of Commerce.

While the completion of the Trans-Andine Railroad is especially memorable because it is the first line that has conquered the hitherto impassable Andes, it also marks a step hardly less important in the breaking away of South America from the dominion of the rivers that as commercial highways have been supreme for centuries. The Oronoco River on the north, navigable for 1000 miles; the Amazon and its many branches in northern Brazil, comprising 15,000 miles of streams available for commerce; the San Francisco River in central Brazil, the Parana-Paraguay system on the south, the Magdalena River in Colombia, the Rio Negro in southern Argentina and the River Plate—these are the great streams that have made up an unrivaled though detached chain of waterways. In the earlier stages of civilization and development these rivers fulfilled their mission. Under modern conditions, it is needless to say, they have become inadequate.

Until to-day, except in Argentina, the railroads of South America have been comparatively short, disconnected lines that have been inconsiderable factors in transportation, except locally. Plans are already afoot, however, and are likely to be consummated soon, whereby the roads of Argentina will be connected with those of Uraguay and southern Brazil.

Before the completion of the Trans-Andine Railroad, passengers had to make a long and toilsome journey by stage or by muleback over the Cumbre Pass between the Chilean and the Argentine end of track. This took 6 to 12 hours, and, if the weather was bad, even longer. During four or five months of the year the deep snows on the summit of the Cordilleras blocked the pass entirely and travelers between the two countries had to go by ship "around the Horn."

Dramatic Chapters in the History of the Road.

There have been many dramatic chapters in the story of this Trans-Andine Railroad. It had its beginning in the plan on paper of one William Wheelwright, back in 1860, and its ending in the systematic and businesslike financing and construction work during the past seven years by the great commercial and banking houses of W. R. Grace & Co. and J. S. Morgan & Co. of London and New York. All the world said it was impracticable until these great financial interests took it up. They did not indulge in fantastic theories, but with millions at their command secured the best engineering talent obtainable and pushed the work forward with all speed year after year.

While the heavy mountain section was 160 miles long, the difficulties that had appeared insurmountable were crowded into one little stretch of 13 miles *high* up at the top of the Cordilleras. In these 13 miles are 15 tunnels, many of them short, but one—under the Cumbre Pass—is 2 miles long. A few of the tunnels are straight, a few are curved and a few are almost as crooked as a corkscrew, but all of them were driven through solid rock.

The principal problems were on the Chilean side, where the Andes tower highest and most precipitously. During the winter the snow lies from 10 to 60 ft. deep in these high altitudes, and hardly a foot of the line would be safe from disaster when the snows began to melt. It was comparatively easy to build a railroad along the steeps, but the question was how to guard it after it was constructed and how to keep it from being destroyed by the avalanches. For that reason the unusual amount of tunneling was necessary and the irregular line of the tunnels was caused by the broken contour of the mountains.

The last long tunnel runs directly under the boundary of Chile and Argentina, 3000 ft. below the surface. Exactly above it stands the great statue of the "Christ of the Andes," the monument that was erected at the summit of the pass as an emblem of perpetual peace between Chile and Argentina. If a line could be dropped through the earth from the base of the statue it would strike the center of the tunnel. Nowhere else in the world is there such an imposing religious and commemorative monument as this, among the perpetual snows of the Andes. It is of bronze and of great size. The figure is wrapped in flowing robes and bears a tall cross. It stands on a massive pedestal of granite, through whose center passes the boundary line between the two countries. Travelers across the pass go within sight of it. Now that the line is finished, the pass will be abandoned entirely, and no one, except explorers or curious travelers, will see this historic monument in its mountain solitude.

Copper Production and Stocks.

The official statement for February of the Copper Producers' Association, issued March 10, shows an increase March 1 in the stock of marketable copper in the United States of 8,724,653 lb., as compared with the stock February 1. The statement is as follows:

	Pounds.
Stock of marketable copper of all kinds on hand at all points in the United States February 1.....	98,463,339
Production of marketable copper in the United States from all foreign and domestic sources during February	112,712,493
Deliveries of marketable copper during February:	
For domestic consumption.....	66,618,322
For export.....	37,369,518
	103,987,840
Stock of marketable copper of all kinds on hand at all points in the United States March 1.....	107,187,992

The large sales of copper made in the past two weeks, being for future delivery, will probably have a favorable effect on the April statement.

The First Steam Turbine Locomotive.—The new type of steam turbine electric locomotive, where a turbine of the impulse type is directly coupled to a direct current variable voltage dynamo, which was mentioned in *The Iron Age* December 30, 1909, as being in course of construction at the works of the North British Locomotive Company, Glasgow, Scotland, has been completed and tested. It is stated that these tests were very satisfactory and confirmed the theoretical claims made by its designers.

S. DIESCHER & SONS. Mechanical and Civil Engineers PITTSBURGH, PA.

Postal Reorganization.

The agitation begun by the President's suggestion that the rate of postage on periodicals be raised, to meet the current deficit in the operation of the Post Office Department, has given rise to an extensive discussion in and out of Congress. The present situation seems to be most intelligently analyzed and summed up in the following paragraphs which closed a speech on the post office delivered in the House of Representatives February 22 by Congressman Victor Murdock of Kansas, who is a member of the Postal Committee of the House. It appears to be proved that a reorganization of the Post Office Department is necessary before any logical readjustment of rates shall even be proposed.

"I am in favor of a reorganization of this great department. In any reorganization of the system there are many antiquated things which must be discarded, and there are many new and serviceable things which should be added to make the system fully responsive to popular needs. And that brings me to a consideration of the deficit. There have been annual recurring deficits, with a few exceptions, for nearly 70 years. Occasionally in postal history a Postmaster-General, striking a balance at the end of the fiscal year, on June 30, has announced that the department had a surplus.

"But outstanding accounts for the fiscal year are not in until September 30, and in the year 1882, the banner year, where a surplus was claimed, there was in fact a draft upon the general treasury of $6000. Now, the ordinary impression of a deficit is that it is caused by innovations in the system. In a sense this is true, but it is in the sense in which Sancho Panza remarked that he had observed that large rivers usually ran by large towns. The first deficit was caused by a surplus in the postal system, and from that day to this as a deficit disappears and a surplus is anticipated immediately something new and useful is added to the system.

"Postmaster-General McLean had a surplus of $100,000 in 1827, a tremendous sum in those days. Congress was unwilling that this should go into the general treasury. It was used in the extension of star routes. Before Congress had satisfied itself with star route extension there was a deficit of $315,000 and a scandal. In answer to the storm of public indignation, Amos Kendall took hold of the department and gave it the form it has to-day. But he made the system so rigidly business-like for a time that he wiped out, not only the deficit, but wiped out also the postal business. Revenues remained stationary or fell off. In one year one-third of all the postmasters in the country resigned. By 1840 the express companies, then new, were distancing the Government in the mail business. In that year in Boston and New York more letters were deposited and called for in the principal hotels there than in the local post offices. It was during this period that the Government, overanxious on the score of business-like economy, gave up the telegraph, a surrender the nation must always regret.

"But the eventual disappearance of the deficit led to an innovation—cheap postage. The deficit again appeared, increased, and, as it began once more to decline, city delivery was added, and when it was made city free delivery the deficit again mounted, and after a period again subsided. And as it fell nearer and nearer the point of a balance and a possible surplus, a new departure, in the form of 2-cent first class postage and 1-cent per pound for second class publications was added. Once more the deficit leaped upward. Again, after a period it declined, and again invited innovation, which came in the form of rural free delivery. Now, in the light of this history, I submit that the function of a deficit is this: A check upon innovations while it is increasing, an invitation to innovation and addition to the system when it is on the point of disappearing.

"It is a frequent charge that this or that branch of the service is accountable for the deficit. The parts of the system are so interrelated that these charges are largely gratuitous guesswork. Undoubtedly the time has come when a reorganization of the service would be useful and profitable to all concerned. It has been over 70 years since a complete reorganization took place. The reorganization should include consideration of the following features, among others:

"1. A new classification into bureaus of the work of the department, with a modern method of cost accounting.

"2. The creation of a commission of postal appeals wherein questions of admissibility to the mails and challenged fraud orders could be heard and decided.

"3. A new definition of the Government's monopoly in the carriage of the mails and economic changes in the present methods of compensation for the transportation of the mails.

"4. A complete reconsideration of the rates on all classes of mail, not only as to the rate of one class by itself, but as to its relation to the rates of other classes.

"5. A thorough review of the present standards of classification of mail matter.

"6. The elimination of all antiquated methods which are out of harmony with the needs of the modern system, and the addition of such progressive features as will make the machinery of the present system of complete utility to the nation.

"All or any one of these changes must be attempted with extreme care, and Congress should not pass upon them without the opportunity of thorough research and of unhampered deliberation, with unrestricted right of separate votes on items and the privilege of amendment. Until such research and reorganization occur we will continue to grope, more or less, in the dark."

The Improved Lambert Hoisting Engine.

The Carlin Machinery & Supply Company, Sandusky and Lacock streets, N. S., Pittsburgh, has just received a repeat order for a Lambert hoisting engine from the Jones & Laughlin Steel Company, the first engine having been supplied to that concern about five years ago. The engine just ordered is a 50-hp., double cylinder, double friction drum erector's engine, with four independent spools. The engine supplied five years ago was then a modern one of its type.

Formerly all makes of engines with jaw clutch operated spools or cat heads had the pawls on spools supported by studs or pins in the stand bearings. The engine bed is now lengthened to support this stand, where formerly the stand overhung. The pawl pins for supporting the load on drums are, wherever possible, supported on both ends by the engine bed frame. The dead end of the brake band is attached and adjustable at the engine bed. More and larger studs are used in the crank and drum bearings, and an improved method of boring cylinders prevents the distortion of the cylinder when being bored. When the engine is erected on the testing floor, steam is blown through the cylinders freely before the pistons and rings are put in. The drum shafts have been greatly enlarged, as from tests on this and other makes of engines it was demonstrated that the shafts spring in the center between the drum bearings.

Several orders have lately been filled for contractors' and coal works use. The improvements constantly being made in the Lambert output extend through the shop equipment, and modern methods are noticeable everywhere. The line covers 500 sizes and styles of engines for an enormous field of operation, such as cableways, many of which are in use in the Pittsburgh district; logging engines, shaft sinking and hoisting engines, &c.

The Blevney Tube Polishing Machine.

A machine for finishing brass tubing of all sizes from ⅜ to 3 in. in diameter, built by John C. Blevney, 216 High street, Newark, N. J., is shown in the accompanying illustrations. This machine is primarily intended to finish round brass bedstead tubing, but tubing of a rectangular cross section or small metal punchings can also be polished by employing special types of belts.

Fig. 1 shows the machine polishing ⅞-in. bedstead tubing and Fig. 2 shows the different parts of the machine removed from it. The tubes are fed from left to right on rubber covered roller shafts and are polished by passing under the abrasive belt running over the two outer pulleys. Inside of this abrasive belt is a corrugated cushion leather belt running over the left and middle pulleys. The belts are brought in contact with the tubes by dropping a platen which is built in the form of an iron frame having a series of weights which act independently of each other.

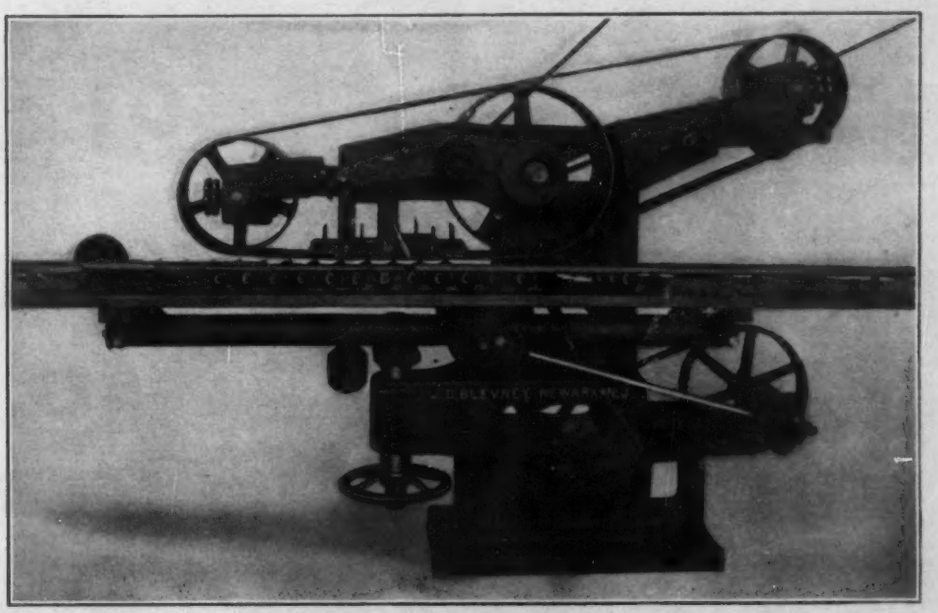


Fig. 1.—The Two-Belt Tube Finishing Machine, Built by John C. Blevney, Newark, N. J., Polishing ⅞-In. Brass Bedstead Tubing.

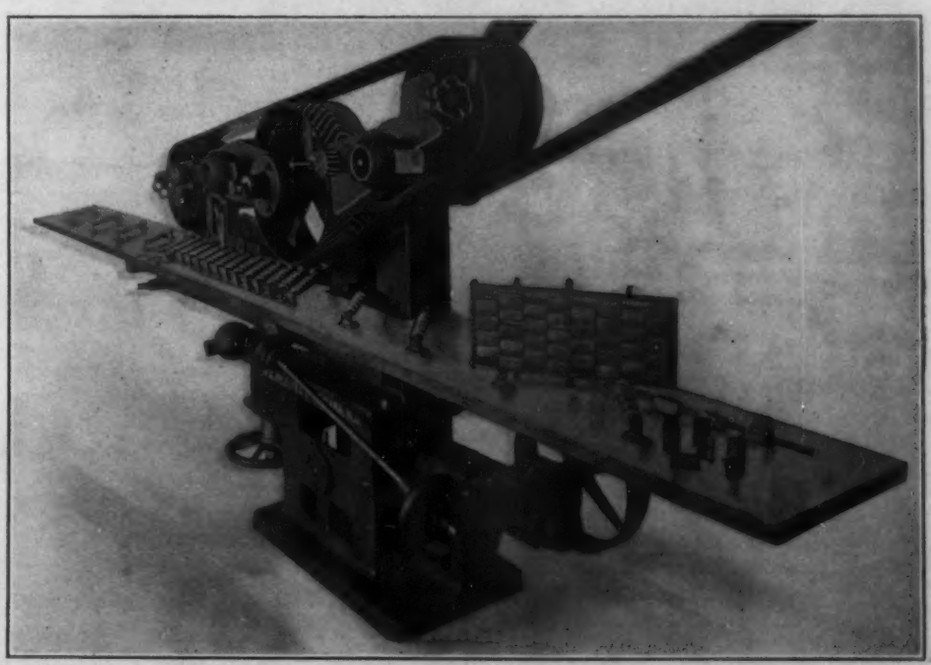


Fig. 2.—View of Machine with Platen Removed. Extra Weights for Securing Additional Tension Are Shown at the Right.

The feed shafts or rods are provided with properly spaced rubber covered pulleys and are made in two sizes. One size is spaced for tubes from ⅜ to 1 in. in diameter and the other for sizes from 1⅛ to 3 in. The abrasive belt is of carborundum, while the corrugated cushion belt is of leather and has V-shaped ridges extending across its entire width. This belt provides a cushion and allows pockets in the abrasive belt to hold the grindings and carry them off the work without scoring the latter. The weights on the platen are sufficient to keep the belt in contact with the surface of the tubes being polished and permits the abrasive belt to follow the irregularities in the surface of the tubes.

To operate the machine the tubes are placed on the feed rollers at the left and the table raised by means of the hand wheel and adjusting screw at the left of Fig. 1 to within about ⅛ in. of the belts. The platen is dropped by the small lever above it, and the tubes are carried through by the friction between them and the surface of the abrasive belt. The rollers are inclined as shown in Fig. 2, so as to revolve the tubes while they are being passed through, and so present all parts of their surface to the grinding belt. To prevent the belt from becoming worn out quickly by always grinding in the one place, the table is automatically shifted during the grinding and thus distributes the wear over a larger area. The proper belt tension is secured by the counterweighted levers shown near the right and left pulleys which force them in or out.

The machine ordinarily produces what is known as a velvet finish on round tubing, if, however, it is desired to color the tubes the table is set at a slight angle to the path of the belt and a felt belt containing rouge is substituted for the carborundum belt usually employed. For tubing of a rectangular cross section an endless belt is substituted for the feed rollers, and for small metal punchings an endless belt containing notches into which the articles may be slipped is employed to hold them.

For 1-in. tubes requiring three cuts to finish, the proper rate of feed is 36 ft. per minute, and with the right grade of abrasive belt gives a capacity of 12 ft. per minute of finished tubing. One boy feeds the tubes to the machine and another removes them after they pass from under the abrasive belt. In this way quite a saving in cost and time is secured over the old method of having a man operate the grinding wheel, and finished tubes appear perfectly straight and not wavy, as when polished with rag wheels.

Ferrosilicon Manufacture.

The Process and the Furnace Used—The Dangerous Grades.

The dangers incident to the shipment of ferrosilicon containing high percentages of silicon have been referred to in these columns from time to time, with some account also of the appointment by the British Local Government Board of a commission of experts to investigate the subject. Several of the leading shipping companies had refused cargoes of ferrosilicon from European ports to Great Britain. The inquiry was in charge of Dr. S. Monckton Copeman, medical inspector of the Local Government Board, and with him were associated Samuel R. Bennett, an inspector of factories, and Dr. H. Wilson Hake,

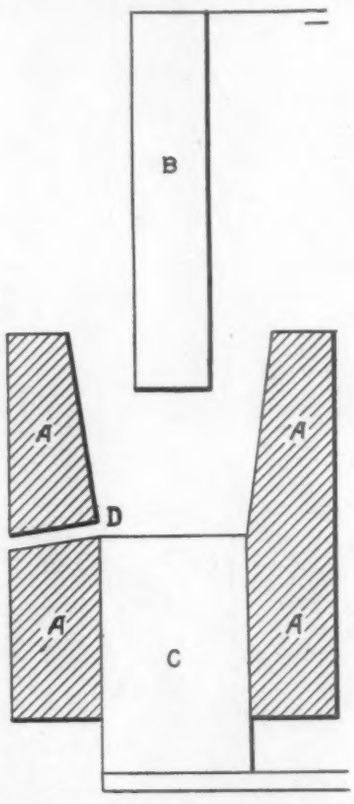


Fig. 1.—Ferrosilicon Furnace, Drawn to Scale. A, Walls; B, C, Electrodes; D, Tapping Hole.

chemist. The fatal accidents which had resulted from the giving off of gases from casks of ferrosilicon stored in the holds of vessels led four of the manufacturers of ferrosilicon in France—the Giffre, Ugine, St. Marcel and Livet works—to give up making the dangerous grades, which were found to be those ranging from 30 to 40 per cent. silicon and from 47 to 65 per cent. It was found that there was no tendency on the part of the grades below 30 per cent. in silicon to disintegrate spontaneously. In the same way the grades containing from 70 to 96 per cent. silicon, while they are more or less brittle, are not so easy to break up and to reduce to powder. Dr. Copeman in his report takes the position that the manufacture of ferrosilicon should be restricted even more than was decided by the manufacturers; he would limit it to grades containing 70 per cent. and upward and to those containing 30 per cent. and less of silicon. Until an international agreement on the matter can be obtained, he suggests that special regulations should be made by the Board of Trade in order to prevent as far as possible further accidents in transmission.

The report of the British commission contains interesting data, some of which are given below, as to the manufacture of ferrosilicon.

Materials of the Charge.

Originally the charge of ferrosilicon furnaces was composed of a mixture of (1) iron pyrites or other form of iron ore; (2) siliceous material in the form of quartzite or sand; (3) carbon in the form of charcoal, coal or coke, together with (4) some lime as flux. Owing, however, to the obvious impurity (especially high phosphorus and sulphur content) of earlier samples of electric furnace ferrosilicon, scrap iron and steel shavings are now preferred to iron ore, and quartzite to sand, as being less productive of obstructions in the furnace. Further, the purer the material used the less slag will be formed. The addition of lime seems to have been entirely abandoned as unnecessary. This is noteworthy, since the calcium phosphide in the ferrosilicon is one of the principal sources of poisonous gases, being decomposed in contact with water or moist air, with evolution of phosphoretted hydrogen. The materials employed at the Keller-Leleux works at Livet, France, are as follows: Iron and steel shavings, quartzite containing 94 to 96 per cent. silica; anthracite coal (averaging 7 per cent. ash, 0.013 per cent. P., 0.41 per cent. S.—no arsenic).

A summary of the process of manufacture and details of the construction of furnaces employed are given as below by *Metallurgical and Chemical Engineering:*

Furnace Construction.

Resistance furnaces are used throughout for the manufacture of ferrosilicon. The furnaces which Dr. Copeman saw in operation at the different works visited were, for the most part, of very similar character and size, the main differences being in the external shape—usually circular (as are all internally), but in one or two instances square in section—in the size and shape of the upper electrode and in the mechanical means adopted for raising and lowering and usually for water cooling this electrode. The furnaces at the Bozel works, one of the plants of the old ferrosilicon syndicate, are provided with two tapping holes, from which the molten ferrosilicon is run alternately, whereas in the case of the furnaces at other works one tap hole only is provided. The furnaces are built up of firebrick, sometimes lined with "a composition of

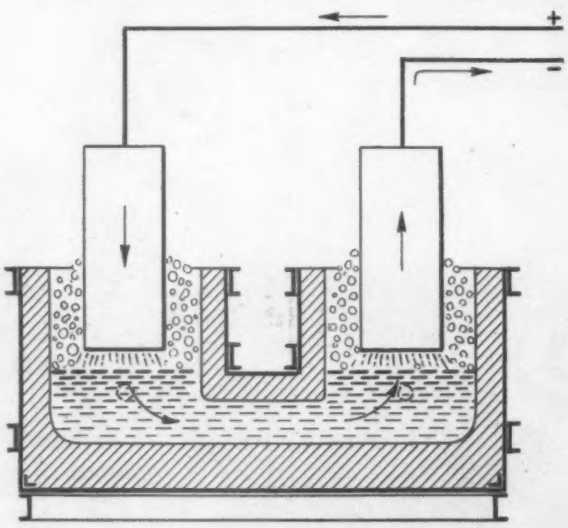


Fig. 2.—Keller Furnace.

graphite somewhat similar to that employed in the manufacture of the electrodes," and the exterior of the furnace is usually braced with iron "stays" or completely inclosed in a circular or square iron casing made up of sections bolted together.

Figs. 1 and 2 show different designs of ferrosilicon furnaces. Fig. 1 is a drawing to scale of the usual type of furnace. Fig. 2 shows the design of the Keller furnace. Except in the case of this furnace, specially designed by Keller, the second lower electrode is

placed beneath the floor of the furnace, its upper surface being flush with the level of the furnace hearth. At the Giffre works, for instance, this lower electrode is formed *in situ* by ramming into an open space in the floor of the furnace a mixture formed by heating together powdered retort graphite and coal tar. The power employed in each furnace ranges from 250 or 300 hp. to as much, in some cases, as 750 or 800 hp.

The type of furnace used in the Keller-Leleux works is such as to obviate the use of the furnace hearth as a conductor. Further to ensure the continuity of working, several electrodes are placed in parallel in the system, any one of which is renewable without the necessity of stopping or varying the working of the furnace as a whole. Keller's furnace, constructed on these principles, contains at least two groups of two electrodes each, the two latter being arranged in parallel, and the two groups themselves in series. These four electrodes of equal capacity project through refractory walls, and each electrode is provided with independent mechanism by which it can be raised or lowered at will. The voltage and amperage employed (the former especially) varied somewhat widely at the different establishments inspected, ranging from 40 to 75 volts and from 10,500 to 15,000 amperes.

When once charged and started the furnaces are run continuously for an average period of a couple of years, although, as stated at the Keller-Leleux works, the period may be extended to as much as four years. While running, the furnaces are tapped at intervals of one to two hours, the men working in shifts so that the furnaces can be attended to by night as well as by day, fresh amounts of charge being shoveled on the top of the furnace around the upper electrode as often as is rendered necessary by the melting and consequent shrinkage of the underlying mass.

The Process of Manufacture.

In practice the requisite amounts of the three ingredients of the charge are weighed out separately, the quartz and anthracite coal having previously been reduced to small fragments of a size varying roughly from that of a filbert to that of a walnut. After weighing, the different materials are thrown together into a heap on the floor of the furnace house, where they are mixed as thoroughly as possible with a shovel. The resulting rough mixture is then thrown on to the top of the furnace, a shovelful at a time, care being taken to heap it up around the vertical electrode or electrodes, as the case may be.

To receive the molten material when the furnace is tapped a shallow bed of sand is prepared, either on the floor or, as was the case at one of the manufactories visited, in an iron box on wheels, which accordingly can be removed as soon as the tappings shall have to come to an end. Usually, however, immediately the flow of white hot liquid has ceased, the surface of the resulting pool of molten alloy is skimmed to remove the layer of slag on the surface, a short, thick log of green wood fixed crosswise on the end of a long iron bar being employed for this purpose at the Keller-Leleux works.

As soon as the cake or slab of ferrosilicon has solidified, it is broken up with heavy iron hammers into comparatively small pieces, which in the case of the 50 per cent. grade, at any rate, it has recently become the custom, at several of the works Dr. Copeman visited, to treat, while still hot, by immersing in a bath of kerosene oil or melted crude paraffin. This "pickling" treatment has been adopted on the assumption that by thus preventing contact with the air by means of a coating of oil or paraffin, it would prove possible to obviate the well-known tendency of certain samples of 50 per cent. ferrosilicon to disintegrate spontaneously, and thus, incidentally, to prevent evolution of noxious gases, mainly phosphoretted and arseniuretted hydrogen.

But as regards the prevention of disintegration (the precise cause of which is still to seek), the kerosene or paraffin bath treatment has not proved successful; while the fumes given off when ferrosilicon which has been "coated" after this fashion is subsequently heated (as seems to be considered necessary before being utilized for its specific action by addition to a bath of molten steel or iron) are most objectionable, owing to the crude material usually employed. In addition, this heating of the alloy before use at iron works must obviously promote in special degree the evolution of poisonous gases, and thus prove a special source of danger to workmen.

In view, therefore, of the complete futility of this process of "pickling" for the intended purpose, coupled with the fact that it may actually involve, later on, an added source of danger to workers in the iron foundries, it is desirable that the method should be abandoned.

Improvements of A. M. Byers & Co. Inc.

A. M. Byers & Co., Inc., Pittsburgh, makers of iron pipe, and also operating puddling mills and Mattie blast furnace at Girard, Ohio, have decided to make large additions to their plants in Pittsburgh and at Girard. At Pittsburgh they will rearrange their warehouse facilities in a building 125 x 218 ft., while the following will be entirely new buildings: Pipe mill, 198 x 308 ft.; boiler house, 51 x 144 ft., and gas house, 24 x 120 ft. In addition a new 20-in. bar mill with engine, heating furnaces and an additional lap weld furnace, &c., will be contracted for. When completed it will permit making lap weld pipe to 12 in. Four Hughes gas producers are to be furnished by the Wellman-Seaver-Morgan Company, Cleveland, Ohio. Additional water tube boilers, aggregating 2500 hp., engines and electrical machinery for power and lighting of from 700 to 1000 kw., &c., will be required. The bar mill will be located in the space now occupied by the old plate mill, which is to be dismantled. In the lap weld department the capacity will be considerably increased. Contracts for the equipment will be awarded within a week or two, and the new lap weld furnace is expected to be ready for operation by November 1, the other work to follow later.

At the Girard plant 46 new puddling furnaces, a puddle mill and a new 26 x 66 in. plate mill, with engines, &c., are to be added. The plant there now has 42 puddling furnaces, so that it will more than double its puddling capacity. New boilers of about 1000 hp. of the waste heat or direct fired type and electrical equipment for operating the roller tables, shears, &c., will also be required. The McClintic-Marshall Construction Company, Pittsburgh, has the contract for the new buildings at Girard, which include one 80 x 450 ft. for the puddle department and one 102 x 250 ft., with a 15-ton electric traveling crane, for the plate mill. Ground will be broken about April 1, and it is expected that the Girard improvements will be completed by about September 1, when about 300 men will be employed there. The Girard plant furnishes the muck bar and skelp for the Pittsburgh pipe mills.

It is estimated that the additions noted above will cost about $500,000 and will make A. M. Byers & Co., Inc., one of the largest producers of iron pipe, in all sizes up to 12 in. in diameter, in the country.

A complete equipment of rivet rod furnaces and rivet heating furnaces has just been installed at the Lackawanna Bridge Company's new plant in Buffalo, N. Y., by Tate, Jones & Co., Inc., Pittsburgh, Pa. It consists of 12 portable oil burning rivet heating furnaces of the same type furnished by this company for many bridge and structural plants, and one large oil burning rivet rod heating furnace. Absence of smoke, ease of regulation of the fires and saving in fuel cost have been accomplished by this installation.

COMPRESSED AIR AND ITS USES.—III.

Horizontal Excavation (Continued).

The Pennsylvania Tubes.

The Pennsylvania Railroad's tunnel system consists of two tubes beneath the Hudson River to the station on Thirty-third street, near Broadway, connected by two and three-track tunnels to four tubes beneath the East River to the Long Island side. Of chief interest, so far as pneumatic construction goes, are the six river tubes. Those beneath the East River constituted perhaps the more formidable part of the undertaking. The profile, Fig. 15, shows that the line passes on a down grade beneath Bergen Hill, on the New Jersey side, to a point nearly 100 ft. below the surface of the Hudson or North River, then rises to the station, and passes by another dip and rise under the East River to its exit on Long Island. The latter is not shown on the profile, and it is to be noticed that the vertical scale is exaggerated with respect to the horizontal. The lowest depth beneath the surface of the East River falls distinctly short of 100 ft. Notwithstanding this, the East River tunnels presented the greater problem, partly because of the close approach to the bottom of depressions in the river bed and partly because of the character of the material.

From the New York station to the Long Island portal is about 4½ miles, and to expedite construction more than one shield at a time for each tube was driven. For this reason and to provide access for men and material, permanent vertical shafts were constructed both on the New York and Long Island sides. As all these shafts were to go far below the water line, four caissons suited for either open or pneumatic excavation were planned. Two tubes corresponded to each. On the New York side it was unnecessary to use compressed air, the rock strata being sufficiently solid to permit both caissons to be stopped above the tunnels and the excavation continued without either compressed air or the caissons themselves. It was desirable to have not only the bottoms of all four shafts in rock, but to have a sufficient body of it along the line of the tubes to provide suitable locations for bulkheads and air locks. On the New York side there was no difficulty in meeting these conditions, but on the Long Island side the rock surface was considerably depressed, at one point, and the choice of locations for the shafts was restricted. One caisson was put down in the river itself, where the water was 16 ft. deep.

Both Long Island shafts were sunk by pneumatic methods. The caissons were steel shells with concrete walls, and had an internal cross section of 30 x 64 ft. The caisson was divided by a 6-ft. partition, into two compartments, one for each tunnel tube and round openings somewhat larger than the tunnels were provided in the east and west walls. During the caisson sinking these were closed by steel bulkheads. Penetration was effected to 78 ft. below the hydrostatic level, which would, apparently, require 34 lb. air pressure, but it was not found necessary to keep the air pressure equal to the hydrostatic head. The working chamber of each compartment was 7 ft. high, with a roof of steel girders 6 ft. deep 5 ft. apart, connected by arched steel plates. Each compartment had two air shafts, each 3 x 5 ft. in section, and divided vertically into two passageways, one for men and one for material.

Even in their initial unfinished condition these caissons were very heavy, and to prevent sudden and unequal penetration at the beginning a number of brackets were arranged around the outside and the sinking controlled with blocking and hydraulic jacks. Later the sinking was controlled on the inside by blocks and posts. At times, when the caisson was to be lowered, the air tension would be dropped 10 lb., which was equivalent to adding about 2100 tons. The concrete was kept at or near the surface. From 5 to 20 ft. of water would ordinarily be in the space between the air shafts and the caisson wall.

These caissons were sunk about 54 ft. through rock, and to prevent their injury through contact with the rock the excavation was here continually kept considerably larger than the plan area of the caisson, and clay in bags placed under the edge so that as the caisson came down a lining of clay was provided for the shaft and next the caisson wall.

When the shafts were completed the erection of the eight shields was commenced, four on each side of the river, and with these the intervening 3900 ft. of material was penetrated. This consisted of rock, sand, clay, "bull's liver" and intermingled boulders. When work was approaching completion operations in three of the tubes were suspended, as otherwise the pairs of mutually approaching shields would meet in soft material, which was undesirable. All shields met in firm material somewhat east of the reef of rock, shown in the profile, Fig. 16, of the most northerly tube, which may be taken as typical.

It will be observed that rock extends eastward from the Manhattan shaft. This it was that made possible the final sinking of the shaft without the caisson or compressed air. Its eastward extension also permitted a first section of the tunnel to be excavated without air. To support the shield jacks on the west at the bottom of the shaft a ring or two of the iron lining were erected and supported against horizontal thrust by timbers placed across the western outlet of the shaft chamber. The shield was then shoved on and the tube excavated for perhaps 60 ft. and the iron lining erected as usual. Then the rock became less solid, and it was necessary to get ready to use air pressure. This air pressure was probably about 30 lb. and exerted a backward thrust of about 1,800,000 lb. Accordingly, strong bulkheads and secure attachment were necessary. The lining itself did not fit the excavation, because the shield to envelope it must be larger. To firmly secure the initial sections of lining to the rock where the bulkheads were to be placed, steel plate rings were placed in segments between rings of lining. These had radial slots corresponding to the bolts between lining rings. The plates were put in position before the shield was cleared, and when the latter was shoved ahead they could be knocked outward and thus made to provide a series of projections. A concrete dam was built at each end of the section of 50 or 60 ft. to occupy the space outside the lining next the rock. Then grout was filled in between the two dams, and thus imbedded the projections and filled the irregular surface of the rock. All four of these tubes were put under air pressure in the fall of 1905. This marked the beginning of the real subaqueous

Tunneling From the Manhattan Side.

The effect of the excess of the air tension over the hydrostatic pressure at the top of the tube was to be feared, as already explained. Just east of the pier heads on the Manhattan side the layer of sand above the top of the tunnels was only about 8 ft., inadequate to resist the excess pressure, so a blanket of clay was employed to supply the necessary weight and impermeability. To maintain the navigation channels the Government restricted the thickness of the blanket at first to a thickness of 10 or 12 ft., but later granted an increase, and still further permission was given for limited areas.

Fig. 15.—Profile of the Pennsylvania Tunnel System from New Jersey to Long Island.

The clay totaled 283,412 cu. yd., and the blanketing cost over $300,000. The clay blanket is shown in the profile of Fig. 16.

A great loss of air attends a blow, which may severely test the air compressor plant; but, aside from such spectacular leaks, there may be a steady drain through overlying porous material. It is impossible to tell in advance what capacity the compressor plant should have. For the four tubes from the Manhattan side a rated capacity of 25,000 cu. ft. per minute proved entirely inadequate. In less than a month after beginning compressed air work in the northern tube, excavation was suspended for about 10 months. In another tube but little work was done for a considerable period. The plant was increased to a rated capacity of 35,000 cu. ft. of free air. For periods of one or two months the consumption would average above 20,000 cu. ft. per minute, with only part of the excavation going on. This is a quite different condition from that experienced in vertical pneumatic excavation. There was a maximum consumption of nearly 29,000 cu. ft. per minute for 24 hours, apparently. The greatest 24-hour record for a single tube was made by the one which had been discontinued for 10 months. Here 19,000 cu. ft. per minute was consumed. This was almost the safe working capacity of the entire original plant of five compressors. When the Long Island headings were being driven, they had a plant with a rated capacity of 45,400 cu. ft. per minute back of them. This proved more than adequate. So it is apparent that the determination of the plant capacity required is largely guesswork. The entire consumption of air for excluding water in the East River tunnels, including the air supplied the pneumatic caissons on the Long Island side, amounted to 34,109,000,000 cu. ft. In addition an amount nearly equal to one-third of this was consumed in supplying power. This air had a tension ranging from 80 to 125 lb. per square inch. About four-fifths was employed in work performed in headings or other chambers, also under compressed air, but at a lower tension. When this air exhausted the

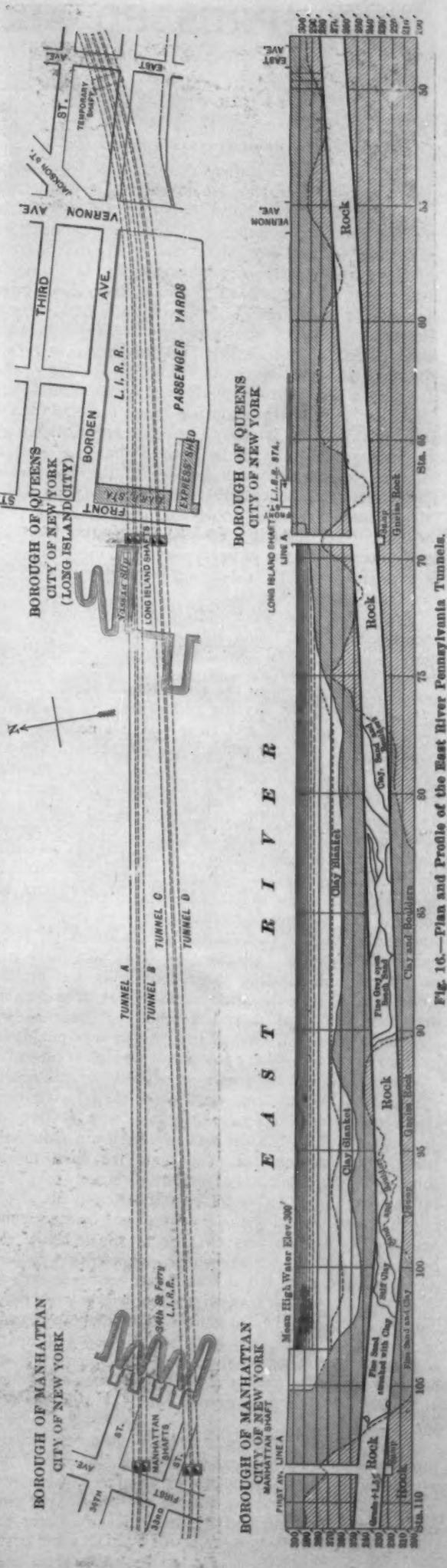


Fig. 16.—Plan and Profile of the East River Pennsylvania Tunnels.

Fig. 17.—A View in Front of a Tunnel Excavating Shield.

tension fell only to that of the surrounding atmosphere. This had an average of, say, 28 or 30 lb. per square inch. The effective power was supplied merely by this limited expansion, and consequently the pressures required for machines—such as rock drills—had to be proportionately higher.

Tunneling from the Long Island Side.

In beginning the driving of the tunnels westward from the Long Island shafts, it was not necessary to construct bulkheads to confine the compressed air, as the roofs of the working chambers of the caisson served that purpose. It was only necessary to open the side of the air chamber at the foot of the shaft and start the shield. The roof at the distance of 7 ft. above the cutting edge had already been removed and the shield erected in the enlarged chamber thus formed, whose roof was a second deck and high enough to clear the shield.

In passing through porous material it is often possible to plaster portions in front of the shield with clay and thus prevent or reduce the loss of air. Again, the material may be so soft as to require very considerable temporary support. Fig. 17 is a view showing conditions in front of one of the shields. The shield is to the right. The boarding up of the face of the excavation and the telescoping devices for its support are in plain view. On one of the lower supporting timbers is a mass of clay used for stopping leaks.

With the larger shields used by the Pennsylvania Railroad it was easy to install more jacks. Fig. 18 shows a shield which employed 24 jacks. There are two erectors, operating hydraulically.

An examination of Fig. 16 (profile) will show that a very great variety of conditions presented themselves. After leaving the rock on the Manhattan side, a fine sand covering the whole face of the heading was passed through, but later clay appeared at the base and covered more and more of the lower part of the face. A little further on, when sand was at the top half and clay at the lower half, a stratum containing boulders appeared at the very bottom. Still later a point was reached where sand, clay, boulders and rock were all present. The layer of clay was continuous here, and, because it again appeared after the reef was broken through on the east side, it has been thought probable that it was also continuous over the top of the rock. If so, it undoubtedly assisted in retaining the air, forming a natural blanket. The mixture of materials encountered by the shields in the vicinity of verticals numbered 80 and 85 is plainly seen from the profile. It is also evident that the shields progressing from the Long Island side, met not only this soft material, but also a very considerable amount of rock. Because of the great variety of material in the strata and because of the obliquity of their disposition, it is probable that no other subaqueous excavation ever presented more problems.

Excavating Methods Employed

In going through all rock, several methods were applied. The shields had three stories. Following one method, excavation into the rock was carried on in the lower third of the shield. The width, however, of this pioneer heading was made about 12 ft. It was then possible upon clearing out the muck to blast the upper portions and otherwise enlarge the heading to full size. But the process of enlargement, proceeding as it did by blasting, had the effect of creating a pile of muck at the entrance to the pioneer heading, and thus hindering simultaneous work in pressing it forward. This procedure has been termed the bottom-heading method. It was found advisable to carry on the excavation differently because of the reasons given. If the rock was solid enough to permit a pioneer heading, it would be pushed ahead the full width of the face, but with its floor quite elevated. The amount of rock thus left to be blasted down from the roof was not large. In dealing with it at first, the practice was to operate from the floor of the highest compartment of the shield. A

Fig. 18.—Behind One of the Pennsylvania Shields, Showing the Large Number of Propelling Jacks Used.

wooden platform was constructed out from the floor of the middle compartment to receive the muck when the rock in the roof was blasted. Muck cars, operated through the bottom part of the shield and beneath this platform, could readily be loaded from it. They could also reach the muck pile somewhat ahead at the rear of the pioneer heading. But this platform method seems to have been something less than perfect, as later on the platform was dispensed with. The rock overhead was blasted in part from the pioneer heading itself, the muck falling upon its floor. The track for the cars was inclined upward from the face of the shield and carried to the base of this pile of muck. There was thus left some rock at the top of the tunnel, but its amount was so small that, when by operating from the floor of the uppermost compartment of the shield it was blasted down, no particular provision was required for the muck. However, there were cases where it was scarcely safe to use either the bottom heading or the center heading. All parts of the face would then be dealt with in close succession.

Fig. 18 shows a shield whose diaphragm can be completely closed. It seems to have been expected that it might be possible to operate with a reduction of air pressure behind. This shield was fitted with air locks accordingly. Further, it was thought advisable to have a means of cutting off the working chamber ahead of the shield when blows occurred. But this procedure of keeping only the space in advance of the shield under full air pressure was never followed. It was early perceived that a closed diaphragm was undesirable. When the Manhattan side of the midstream reef was encountered, the diaphragm was cut through, and a considerable opening made at the bottom. The bottom heading and center heading procedures depend for their success upon free passage of muck cars through the shield.

The profile, Fig. 16, shows places where penetration was through a stratum of rock whose upper surface fell short of the top of the tunnel. Here was difficult work, indeed. The rock was removed by blasting, and meantime the soft overlying material had to be supported. In such cases the shield was fitted with a hood. If excavation into this material were made in advance there would be danger of a collapse before the hood could be got into position, so the earth was supported by temporary timbering until a shove was made. Frequently the timbering would extend forward a distance of two shoves. With the soft material removed and that surrounding it supported the rock could be dealt with. Marsh hay, bags of sawdust and clay were used to fill in cavities behind the timbering. If the material was porous a specially prepared clay was used to make the joints tight. The Hudson Companies' shield, as stated before, could sometimes be advanced through the mud or silt by closing the whole or a part of it and using the jacks, but this was not practicable under the East River. With the Manhattan shields soft penetration was effected by a system of devices known as shutters. These were used on the upper part of the shield, while at the bottom the diaphragm was more or less open. Through the advance and collapsing of these devices in connection with hand work part of the material in front could be brought to the rear of the shield. As the air pressure corresponded usually with the hydrostatic head of a point near the axis of the tunnel, this material would be rather dry. Below, however, where the pressure of the water exceeded that of the air, the material would be wet and somewhat fluid. The effect of these conditions was that, at times, the material below would run continuously, while that above would break intermittently, as it would be sufficiently undermined from the loss of support. If this upper face were of sand air might be expected to escape, as it was practically inaccessible to everything else. The shutter method was not employed with the shields advanced from the Long Island side, probably because of this experience. The upper part of the face of a soft heading would be excavated a short distance and securely timbered. When the shield was advanced the pressure effected a flow of the wet material below. The average daily rate of penetration by this method during four months was 8.74 ft. per shield.

When the shields were about to meet special precautions were taken. The excavation was advanced a little, belled out to a larger cross section and carefully timbered. The timbering above reached back far enough to permit removing the hood, which was done. The face was then covered with a thick wall of clay in sacks and this by a bulkhead of concrete to prevent blows when the material between shields should be thin. To ascertain exact relative positions tubes were driven from one tunnel to its companion. These pipes, 8 in. in diameter, varied from 30 to 100 ft. long. Deviations from exact correspondence were found to be slight. It was necessary, however, to do some jockeying to make perfect contacts. Before actual junction could take place, moreover, the floors of the shield compartments had to be cut away somewhat. The four tunnels were made continuous early in 1908.

The Lining.

The lining used in these tunnels was mostly cast iron rings, although rings of cast steel were employed in small quantity. The rings were wider than those used by the Hudson companies, as well as larger in diameter. There were 12 segments to each ring, one very short and used as a key. The ordinary segments were 2½ ft. wide and 1½ in. thick. They were flanged all round, making the complete depth 11 in. These flanges varied in thickness from 2¼ in. at the root to 1½ in. at the edge. Each ordinary segment weighed about 2020 lb.; the key, 520 lb.; hence a complete ring weighed about 22,740 lb. As there are in the four tubes between the Manhattan and Long Island shafts about 15,600 ft., or 6240 rings, the weight of the lining amounts to about 70,000 tons. Measured on its outer face, an ordinary segment was 6½ ft. long, the key 12¼ in. Joints between the ends of ordinary segments were in axial planes. The key, however, was longer (circumferentially) within than without. The convergence of the corresponding end joints was without the tunnel. This arrangement was made for the purpose of erection. With all joints converging to the axis, the final piece could not have been put in place. The external faces of all flanges were machined, and the edges cut away where otherwise they would have contacted and the grooves resulting upon erection were caulked up. Six bolts arranged on the same circumference bound an ordinary segment to an adjacent ring. Five bolts in staggered arrangement bound one segment to its neighbor in the same ring. The narrow keys had but one bolt front and back. The erection of a ring accordingly involved the use of 127 bolts. Altogether, about 750,000 bolts were used. Special rings having a convergence of faces amounting to ¾ and 1½ in. were employed to effect changes in the direction of the axis. Where curvatures of 1 degree 30 min. were desired, rings having the lesser convergence were employed between groups of, say, three parallel rings. It was often necessary to employ tapered rings to facilitate the exit of the lining from the shield, especially where the shield deviated from the grade on account of insufficient support by wet material underneath it. At the center of each segment was the grout hole, threaded for 1¼-in. pipe. As the shield would clear the lining, the open space outside the rings would be grouted up by making connections between these holes and a grouting machine. This operated under an excess air pressure and forced the fluid into position. To grout up a single ring required about 37 barrels of 1:1 Portland cement grout.

The tunnel lining and the bench walls are also concrete. THE END.

The Cincinnati 56-In. Special Forge Planer.

For severe duty and situations where the side heads are required to do the majority of the work, the Cincinnati Planer Company, Cincinnati, Ohio, has designed and built the extra heavy forge type planer shown in the accompanying illustrations. The machine is intended to plane pieces whose maximum width and length do not exceed 56 in. Fig. 1 is a general view of the planer and Fig. 2 is a front view.

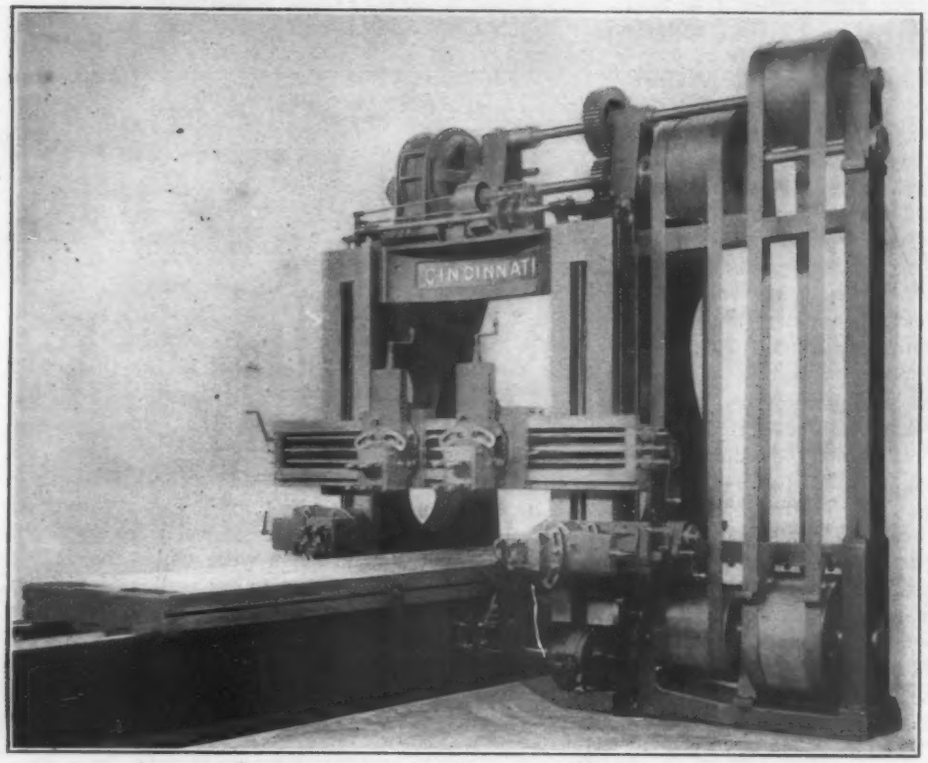


Fig. 1.—General View of a Forge Planer for Severe Duty, Built by the Cincinnati Planer Company, Cincinnati, Ohio.

As will be noticed from the illustrations, the housings are very heavy and wide and the face is 18 in. wide. The side heads have long narrow bearings which permit them to be moved easily, and are also provided with clamps on the inside and outside edges of the housings, the latter being furnished with a taper jib for adjustment. The side heads of necessity are heavy because of the great width of the housing, and on that account are fitted with a rapid power traverse operated by a small lever. All of the gears on the side head are protected by guards to obviate any possible danger to the operator while the machine is in motion. The power elevating device for raising and lowering the cross rail supplies the power for the rapid power traverse. It will be noticed that this device is equipped with tight and loose pulleys. When the belt is on the former it merely revolves the shaft, and by the operation of levers controlling a small friction clutch the rail can be raised or lowered to any desired hight. When the belt is on the latter the shaft is run by the two gears shown on the left side, and in turn drives the two bevel gears so that the head can be easily moved by power whenever desired.

The cross rail is of the usual standard type equipped throughout with taper jibs and furnished with clamps on the inside edge of the housing so as to eliminate any possible deflection of the rail when clamped on the outer edge. The table is of extra heavy construction and runs in wide V-ways in the bed, as shown in Fig. 2, and is equipped with a wide face steel rack. A four wall type of bed is provided, and in addition to the outer wall there is an additional piece of metal running from the inside edge of the V for about two-thirds of its depth.

A 40-hp. induction motor, operating at a 450 rev. per min. is employed to drive the machine, the speed of the motor being reduced to the proper countershaft speed by a rawhide gear. In order to eliminate all cross belts, a second shaft provided with two

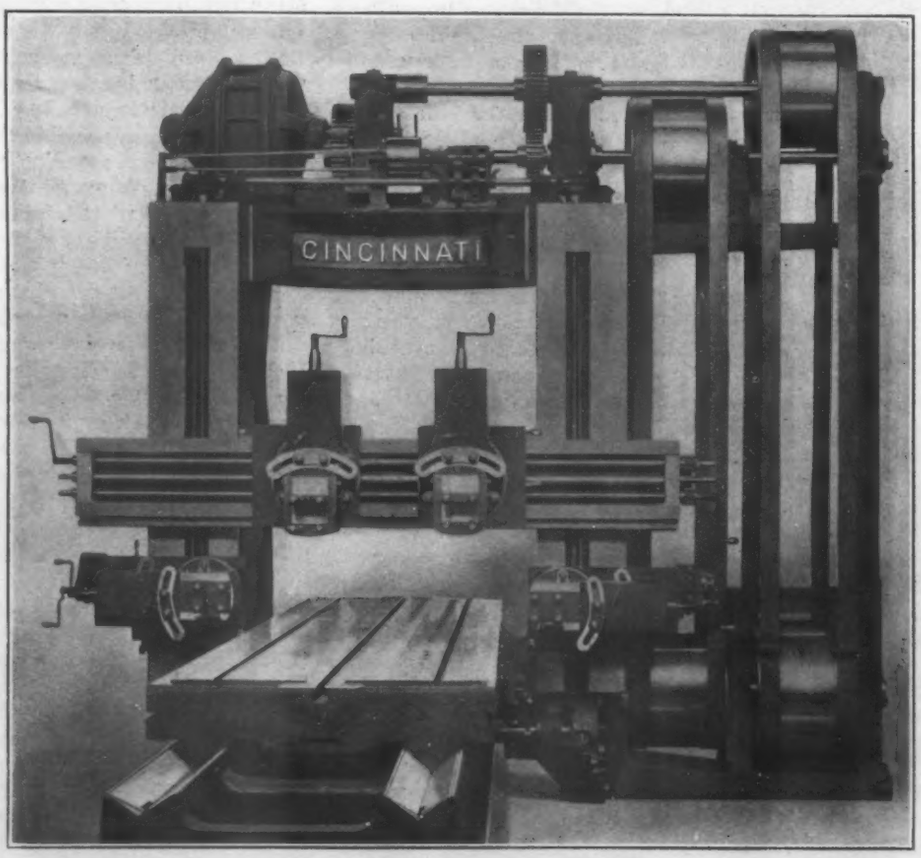


Fig. 2.—Front View of Planer, Showing V Ways in Bed and Guard for Shifting Mechanism.

gears was placed on top of the machine to make the cutting and the return pulleys on the top drive revolve in opposite directions. The bearings for this shaft are fitted with long bronze bushings and a ring oiling device to obviate any danger of insufficient lubrication at high speeds. In order that the top drive might supply sufficient power the machine was fitted with four 4-in. belts, two for the return and two for the cutting pulleys. These belts deliver their power to the 30-in. pulleys on the shaft, which is supported by a large bracket and ample bearings on account of its great length. The loose pulleys are provided with a special oil reservoir which, it is stated, will insure lubrication even if the operator should neglect to supply oil for some weeks.

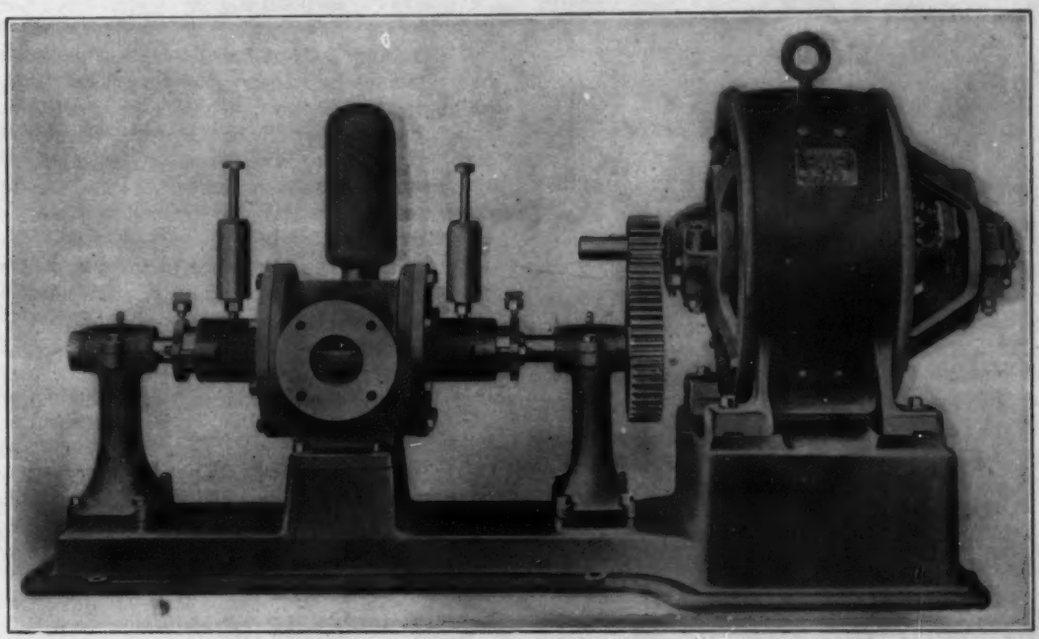


Fig. 1.—A 300-Gal. Curtis Rotary Pump with Motor Drive, Built by the Pittsburgh Machine Tool Company, Pittsburgh, Pa.

The chips will naturally fall on the shifting mechanism, where the side heads perform most of the labor. To obviate any possibility of any danger being done, a special guard, shown in Fig. 2, was designed to cover the mechanism. While protecting the shifting devices completely, it is stated that it does not interfere in any way with the setting of the dogs controlling the table movement or the hand operation of the shifter.

The Curtis Rotary Pump.

A positive rotary pump capable of being used with either high or low heads has been built by the Pittsburgh Machine Tool Company, N. S., Pittsburgh, Pa., for mine service. Although designed for that particular use, it is also equally well adapted for any service where piston pumps can be employed. Fig. 1 shows a pump having a capacity of 300 gal. per min. connected to an electric motor through gear and pinion, and Fig. 2 is an end view of the pump with the head and end plate removed.

The pump consists of an outside casing or body and an eccentric shaped lining pressed into it. There are two heads, one on each end, which are fastened to the body with studs and nuts and inside bronze auxiliary heads are fitted into a recess in the pump body. The impeller or rotor revolves inside this lining and is provided with slots in which the buckets slide. In the larger sizes these buckets are made of wood and the smaller acid resisting material is employed instead. The pump is generally made of cast iron bronze lined, but for handling acid mine water, solid acid resisting bronze is substituted. The bearings are of lignum vitae, which needs practically no lubrication, and can be easily replaced. To take care of any solid substance that may pass through the pump and prevent cutting of either the rotor or the lining, dirt pockets are provided ahead of the buckets.

In operation a vacuum is created by the centrifugal action of the buckets, which sucks in the water. As soon as the water reaches the pump the buckets are pressed against the lining of the pump by the pressure of the water within the pump. This is conducted under

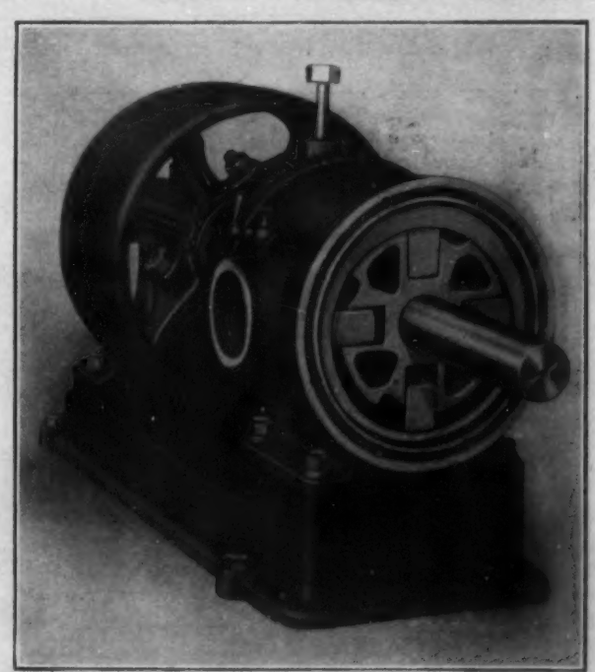


Fig. 2.—View of Pump with Head and End Plate Removed, Showing Interior.

the buckets by ports connected with the discharge side of the space underneath the bucket. The water under the bucket is discharged at the top of the pump by ports in the auxiliary heads or end plates, which fit into the recess in the end of the pump cylinder and are held in place by the outside head, which carries the stuffing box and the bearing.

The simplicity of the construction of this pump will be apparent after an inspection of Fig. 2. There are no valves, springs or piston rods to wear out, and the lining is so made that it can be taken out and renewed at any time. The end plates can also be renewed, and the replacing of the buckets is a very simple operation. All that is necessary is to take off the

head and end plate and pull out the old buckets and push in a new set.

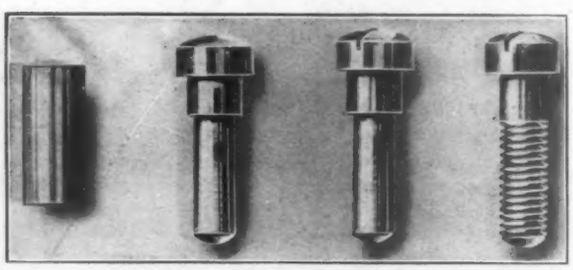
The pinions employed with the large size pump, illustrated in Fig. 1, are either steel or fiber, as may be preferred. The journals in the heads are of lignum vitae, which will run fairly well without lubrication of any sort, but two large grease cups are provided, however. These cups are especially long and the grease can be forced in by screwing the plunger down with an ordinary wrench. Air chambers, which greatly reduce the water hammer, are furnished on all the larger pumps.

Several sizes of pumps ranging from 25 to 1000 gal. per min. are built for driving by a belt, gasoline engine or direct connection to an electric motor. These pumps are well suited for cases where the amount of available space is limited and large capacity is wanted with a limited amount of space and weight. At the present time there are a large number of these pumps installed in the anthracite and bituminous coal fields, and it is stated that they are operating satisfactorily.

The New International Screw Machine.

The half-tone shows the four stages in the manufacture of a machine screw in the new screw machine invented by George T. Warwick, Springfield, Mass., and built by the International Machine & Screw Company of that city. The company does not propose to put the machine itself on the market at the present time, but rather to make a specialty of its product, and the details of its mechanical construction are consequently not available. However, a general idea of the operation of the mechanism is of interest.

It is entirely automatic, taking the stock from a coil. No cutting tool is employed except for cutting



The Four Stages in the Manufacture of Screws in the New Screw Machine, Built by the International Machine & Screw Company, Springfield, Mass.

off the blanks. The metal is drawn into shape and is threaded by a rolling operation, having original features, notable among which is the use of cylindrical instead of flat dies. No weight is lost in the process; the screws obtained from a given amount of stock weigh the same as the stock. A 3-16-in. screw of any length is produced at the rate of 100 in 2.9 min. From a 1-in. blank a 2-in. screw is produced.

The stock is fed into the machine through a series of straightening rolls to a shear that cuts off a blank, which is embraced by a set of jaws and slightly compressed at the top and bottom. It then passes in successive stages through a series of chucks having a forward, backward and sideways motion, and also a rotating movement. Each chuck presents its blank to a pair of oscillating elongating jaws. Thus the individual blank is seized by a chuck and delivered to a pair of jaws, the chuck returning to its original position for the next blank. The first blank, after the elongating operation is taken by the second chuck to the next pair of jaws, and so it passes along through the series, being turned 45 degrees between each pair. This process forms the shank, materially elongating the piece. In a ¾-in. 3-16-in. screw the elongation is from an original length of 0.564 in. to 0.821 in.

The next process is the slotting, which is another compressing operation, the motion serving to give the head the required form as well as to impress a sharply indented slot. The total length of blank has now been increased to 0.837 in. The blank is now complete, excepting for the thread rolling. Its shank is of a diameter sufficiently less than the outside diameter of the finished screw to allow for the effect of the rolling. The rolling process is a rapid one and also performs the operation of pointing the screw. No oil is used in this work.

Laboratory tests of finished screws gave 1864 lb. as the maximum load in tension tests, and 59 degrees as the angle twisted through before breaking occurred by torsion. The claim of the makers is that the drawing, slotting and elongating process adds greatly to the strength of the product, and at the same time gives absolute uniformity, and without waste of stock.

The machine has been developed as a self-contained automatic covering the entire process, and also as separate machines for performing respectively the operations of elongating, of slotting and of thread rolling, the two latter types of machine being fed from a hopper. All are easily adjustable for the desired size of screw and the tools are of simple construction.

The Cambria Steel Company.

The annual report of the president and directors of the Cambria Steel Company for the 12 months ending December 31, 1909, is far more satisfactory than the report for the previous year, the net earnings from operations showing an increase of $1,191,879.37. The income account for the two years compares as follows:

	1909.	1908.
Net earnings from operations	$2,016,038.82	$824,159.45
Receipts from rents, investments, interest on bank accounts, profit on ore sold, ore mining and lake transportation companies	908,238.96	1,067,690.42
Totals	$2,924,277.78	$1,891,849.87
Deduct fixed charges under Cambria Iron Company lease and incidentals	386,191.14	398,093.48
Net income	$2,538,086.64	$1,493,756.39
Total to credit income account	$2,538,086.64	$1,493,756.39
Which has been appropriated as follows:		
Dividends	1,800,000.00	1,350,000.00
Set aside to general depreciation fund	500,000.00	100,000.00
Set aside to betterment and improvement account	200,000.00	.....
Balance carried to credit profit and loss account	$38,086.64	$43,756.39
Profit and loss account, previous year	$2,403,707.50	$2,356,218.43
Increased by balance of income account transferred as above	38,086.64	43,756.39
And reduced by bad or doubtful accounts, less collection of accounts charged off in previous years	43,065.52	3,732.68
Balance to credit of profit and loss account, December 31, 1909	$2,398,728.62	$2,403,707.50

The balance sheet as of December 31, 1909, is as follows:

Assets.

Leasehold in Cambria Steel Company:		
Property, subject to payment of $338,720 annual rental, under Cambria Iron Company lease for 999 years, being 4 per cent. on $8,468,000 Cambria Iron Company's stock		$33,090,304.68
Plant additions to December 31, 1908	$11,785,577.19	
Plant additions year ending December 31, 1909	849,546.99	
		12,635,124.18
Total leasehold		$45,725,428.86
Ownership in Cambria Steel Company:		
Equipment additions	$1,001,262.14	
Real estate	338,664.72	
Stock in ore and steamship companies, &c.	2,951,309.92	
Inventory of materials, supplies and products	9,032,866.40	
Cash	1,227,622.93	
Accounts receivable	3,540,352.54	
Bills receivable	83,227.09	
Total ownership	$18,175,305.74	18,175,305.74
Total		$63,900,734.60

Liabilities.

*Capital stock	$45,000,000.00
General depreciation fund	3,750,000.00
Betterment and improvement fund	9,600,000.00
Accounts payable, including dividend No. 17, $1,125,000	3,152,005.98
Profit and loss account	2,398,728.62
Total	$63,900,734.60

* The authorized capital stock is $50,000,000, of which $45,000,000 has been issued. The remaining $5,000,000 of stock is unissued, and can only be issued at not less than par.

From the accompanying statement by President Powell Stackhouse and Chairman E. B. Morris the following extracts are taken:

Cambria Plant.—Large expenditures were made for new plant and betterment. The principal of these were: The steel stock bins at Nos. 5 and 6 blast furnaces, the continuous heating furnace at 30-in. beam mill and the rebuilding of No. 5 blast furnace were completed. The new 18-in. continuous bill, authorized in 1908, is about ready for use. Four 50-ton open hearth furnaces are being added and should be productive by May next. The splice bar plant has been changed to a more favorable location, increased in size and more powerful tools added. A large and complete new boiler shop has been built. A rod and wire mill, with the necessary adjuncts for preparing its products for market, has been authorized and is now under construction. It became necessary to re-enter this line of business to aid in providing a broader market for the output of Bessemer steel, the use of open hearth rails having reduced the demand for Bessemer for that purpose.

Gautier Plant.—The new fireproof building for the 13-in. mill was completed early last summer and this mill removed from the Cambria plant and installed therein, with improvements, and is now producing satisfactory results. A new 8-in. mill was completed. Semi-continuous 8 and 12 in. mills were authorized and are now under construction and are expected to be completed this year. To clear the ground, the shear and hammer shop tools were moved to a better location, selected in the existing buildings. A large portion of the wooden building erected after the flood of 1889 was torn down and will be replaced with permanent construction to cover the new mills. The demand upon this plant for bar, agricultural steels and specialties since last spring has been in excess of its capacity, which will be increased by the new mills under construction; costs will also be reduced. To keep up with the constantly growing demand for this class of product further additions to the plant will be required.

Franklin Plant.—The 372 Otto-Hoffman coke ovens have produced a record output in quantity and cost. To supply the demand for fuel for the company's eight blast furnaces it is now compelled to purchase about one-half of its coke. As the cost of producing coke in its own ovens is less than the price of purchased coke delivered, the development of the Hinckston's Run Valley coal field, with the construction of about 400 ovens, is under consideration. A spare gas blowing engine has been completed at Franklin blast furnaces Nos. 7 and 8. Te additions to the open hearth department have been in the line of increased output and cover the substitution of 150 for 90 ton ladles, additional ingot stripper, additional heating furnaces and crane at slabbing mill. The steel car department has produced approximately 50 per cent. of its capacity. No additions other than a few tools have been made or required.

Manufacturers' Water Company.—This corporation, of which the Cambria Company owns the entire capital stock, provides the water supply for the works. The summer and autumn rainfall on the Conemaugh and Stony Creek water sheds is totally insufficient for our requirements and must be supplemented by storage reservoirs. Work at the Quemahoning dam and pipe line was commenced in February and has been actively pressed since. To provide funds for this improvement the additional cost of which is estimated at $3,000,000, the Manufacturers' Water Company issued $4,000,000 of 30-year 5 per cent. gold bonds, redeemable after five years at 102½ per cent.—principal, interest and sinking fund guaranteed by the Cambria Company—of which $1,500,000 was placed in our treasury to repay advances made to the water company in past years, and $2,500,000 was sold.

General.—The company's shipments of steel products were about 80 per cent. of 1906, our maximum year. The business depression continued until early in the spring of 1909, when the prosperous conditions of the agricultural interests of the country were reflected in a large increase in miscellaneous business, which fully employed the company's mills, except those producing railroad material, which were operated intermittently during the year. With the exception of rails, for which the demand was light, the market for our products in the early part of the year was thoroughly demoralized. In order to retain our customers and meet the action of our competitors, orders were taken at low prices, which are reflected in the results of the year's business. Due to the demand for steel, the prices gradually advanced and are now on a remunerative basis. A general reduction in salaries and wages was made April 1, but, due to the gratifying change in business conditions, the former scale was restored July 1. There has been a scarcity of mine labor, caused by the departure during the depression of large numbers of foreign miners to their native country; but they are now returning to this country, and this condition will thus be corrected. Labor rolls show at the close of the year the employment of 50 per cent. greater force than in December, 1908.

Dividends.—At a stated meeting of the Board of Directors, January 20, 1910, a dividend of 2½ per cent. on the six months' business ending December 31 was declared, the dividends to be hereafter declared quarterly. In connection with this increase it is proper to say, for the information of shareholders, that at the time of the reorganization of the present steel company, in August, 1901, it was stated that the earnings of the company, over and above a conservative return upon the actual amount of cash then paid in, would thereafter be applied in large measure to building up the property. This policy has been adhered to during the past nine years, with the result that in this period the sum of $10,000,000 has been distributed in dividends and over $16,000,000 of the earnings has gone into improvements, betterments, depreciation, increase of inventory and other corporate purposes of advantage to the property. The value of the ore and coal properties has increased also in the nine years, without regard to the above expenditures upon the works. The present result is that our company is in better physical and financial condition than it ever has been, and the directors are of the opinion that the time has now come when the cost of further improvements and betterments necessary to reduce manufacturing costs should be at least partially provided out of capital subscribed by the shareholders as needed, and consequently a larger percentage of earnings distributed in dividends. The improvements now authorized and in contemplation, as already referred to in this report, for completion in the next few years, will require the expenditure of approximately $7,000,000, and the $5,000,000 of stock remaining unissued will be offered to shareholders for subscription from time to time, as funds are required for the payment thereof.

At the Oregon district meeting of the United Metal Trades Association of the Pacific Coast, held at Portland, March 1, the question of permitting customers to deduct a discount after the time for discount had passed was discussed, and it will be submitted to the entire membership at the annual meeting of the association in April.

Trade Agreements.

The Sherman Anti-Trust Law Necessarily Disregarded.

The following article, which sets forth the conditions existing under the Sherman anti-trust law, showing how this statute has signally failed to accomplish its purpose, is taken from *Iron Age-Hardware* of March 12:

There was a time when the makers of the various kinds of goods had their organizations, little or large, as the case might be, with regular meetings, monthly or quarterly, where they conferred together in regard to business with a greater or less degree of frankness. They talked with one another about stocks on hand, the influences which enter into increasing or diminishing the cost of goods and the prospects for future trade. An almost invariable part of the programme, however, was some action in regard to prices. An agreement was usually reached by which it was decided to maintain existing quotations, or to make a concerted advance or concerted reduction in price. The decision of these manufacturers was awaited with interest by the trade, and the results of the conference were promptly made public, first by the trade journal which had a practical monopoly in making such reports of the markets, and later by the circulars, letters and traveling salesmen of the manufacturers. When a buyer endeavored, as buyers will, to get an extra 5 or 7½ per cent., it was explained to him that the agreement between the manufacturers was a cast iron one, from which no deviation was permitted. There may, indeed, have been found some indirect way of making some concession, as, for example, by discovering an old back order which in some way had been overlooked and was never executed, or by resorting to some other subterfuge by means of which the price was cut. This, however, has nothing to do with the point we are making, that the manufacturers met, agreed upon prices, and openly and honestly announced their agreement.

All that it now a thing of the past. We are living and trading under the beneficent sway of the Sherman anti-trust law. Manufacturers are no longer permitted to act together in the way above described. We, the American public, did not realize at the time how mischievous, if not immoral, it was for the makers of bootjacks or kites, for example, to fix upon a discount of 70 per cent. as their regular selling price to the trade, and upon 80 per cent. as their extreme discount to the jobbers. But since those days there has been a moral awakening, a campaign against monopolies, and the Sherman anti-trust law! We have arisen to the high plane where such agreements are under the ban of the law, and such iniquitous understandings in restraint of trade are presumed to be abolished by the statute which, aimed at the supposed iniquities of concerns that have to do with oil, or sugar, or tobacco, or transportation, applies as remorselessly to the minor agreements between manufacturers or merchants which are reasonable and useful, if not absolutely necessary to the conduct of business.

The Disguising of Trade Agreements.

One phase of the present situation cannot perhaps be better illustrated than in the remarks of a gentleman well known in hardware circles as the buyer for a prominent house. He was making a list of the dates at which the manufacturers of the various kinds of goods are scheduled to come together, so that he might be in closest touch with the market and know promptly what action was taken, and with a fair chance indeed that he might be able to find out in advance what was likely to be done. He would thus be in a position to place orders, conditional or otherwise, at the right time. The significant remark which he made was to the effect that there are in these days no associations of manufacturers, and no agreements in regard to the prices at which they will sell goods! The disappearance of the associations of manufacturers of the various classes of articles is a strange phenomenon. They have vanished completely as will the snow and ice of winter under the warmth of spring and summer. The curious thing, however, is that the manufacturers come together and act together just the same!

The trade sometimes forget the new conditions under which we are doing business. At a recent convention of retail hardware merchants one of the members said, and said it out loud in meeting, that he and his fellow hardwareman in the same town had agreed on $2.50 as the price of nails by the keg—a very moderate price, by the way, that yielded only a meager profit. Strange to narrate, not a word of protest was raised in the convention, although to reach such an agreement was a violation of the law, and that very estimable merchant made himself liable to fine or imprisonment, or whatever the penalty may be, for violating the Sherman anti-trust law. But practically every merchant and manufacturer is a law breaker in substantially the same way.

A Period of Extraordinary Coincidences.

Thanks to the Sherman anti-trust law, this is a period of extraordinary coincidences. A group of men interested in making a line of goods, say hairpins or rubber stamps, happen to meet at the same place, quite possibly the Waldorf-Astoria in New York or the Auditorium in Chicago. They are seen disappearing into a room, where, behind closed doors, they talk things over. There is no witness to their deliberations, but it has become noised abroad among the initiated that the manufacturers of hairpins or rubber stamps are in session, and when they come out they are eagerly besieged by reporters and buyers, who want to know what was done. It does not take long for the fact to leak out that an advance of 10 per cent. has been made, but each manufacturer insists that this action has been taken by each one of them individually and that it is not a matter of agreement among them. The new price is, we may suppose, 75 and 10 per cent. as the extreme discount. How was it determined upon? If any one in the meeting was thoughtless enough to say, "Let us make the discount 75 and 10 per cent.," this fact never gets to the knowledge of the outside world, for that would be illegal and a violation of the Sherman anti-trust law. Things are *supposed* to take a course something like this: After discussion and a careful canvass of the situation one of the manufacturers remarks that he is going to make his discount 75 and 10 per cent. Another manufacturer then intimates that he has been feeling the necessity of making an advance and intends to make his price 75 and 10 per cent., "without regard to what the rest of you may do," and so it goes around the circle, and the new price is in effect. All this beating the devil around the bush, it is to be noted, is out of respect to the benign Sherman law. They have not agreed (?) on their action, but by a very happy coincidence they simultaneously determine on the same price, a price which they also understand will be maintained by their competitors. Shortly after one of these meetings a manufacturer from Ohio who was asked whether he had agreed to maintain a given price on a certain line of goods, answered: "Do I want to go to the penitentiary? I have told you what my price it, and I understand the other manufacturers intend to make the same price; but remember there is no agreement."

It is a strange and melancholy medley: A law that is admitted to be impracticable of enforcement without causing disaster; more agreements technically "in restraint of trade" than ever before; a general conviction that the obnoxious statute, which has so signally failed, should be amended or repealed; a feel-

ing of uncertainty and distrust, as it is not known when or where or how those in authority will move for its enforcement; and, not the least of the evils in the unfortunate situation, the fact that honorable business men are driven to special pleading and evasion in the necessary and reasonable disregard of the law.

The Weinland Renewable Head Boiler Tube Cleaner.

The majority of engineers throughout the country have been devoting considerable attention to the problem of the economical utilization of fuel, and as a result have come to a realization of the fact that the getting of the greatest amount of heat out of the coal

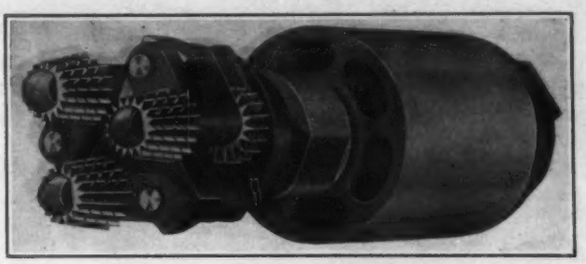


Fig. 1.—A Weinland Water Turbine Boiler Tube Cleaner Fitted with the Quick Repair Head, Made by the Lagonda Mfg. Company, Springfield, Ohio.

does not end with the grate. The transference of heat from the gases evolved as a result of combustion to the water in the boiler is what really counts, and any obstacle to this action causes a loss.

Almost all firemen and engineers are confronted with the problem of keeping the boiler tubes free from the scale which forms as a result of impurities in the feed water. While it has not been determined just what actual reduction in boiler efficiency results from the formation of this scale, there is a marked decrease in the efficiency and steaming capacity of boilers where

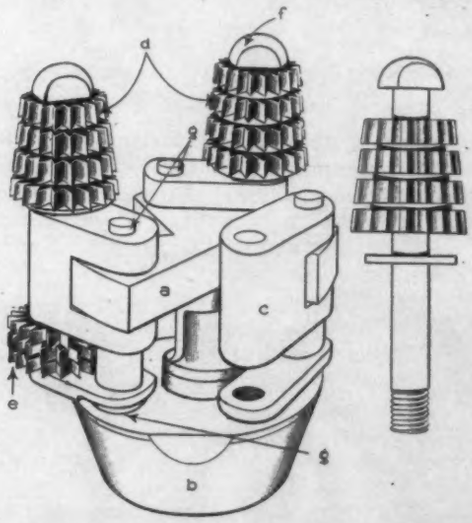


Fig. 2.—The New Weinland Quick Repair Head with One of the Arms Removed, Showing Details of Construction.

the tubes are permitted to become covered with scale, and the only practical method devised thus far to prevent this reduction is periodical cleanings with a boiler tube cleaner.

The Lagonda Mfg. Company, Springfield, Ohio, has recently put out a new cleaner equipped with what is known as the quick repair head, which is shown in the accompanying engravings, and is a distinct advance over the wing head model that was illustrated and described in *The Iron Age*, June 11, 1908. Fig. 1 illustrates the head fitted to a Weinland water turbine cleaner made by this company, and Fig. 2 shows the head with one of the arms removed. Like its predecessor, this head employs the old swinging arm principle, but has a special type of construction that has been developed after several years of experimenting. It is probably one of the simplest and most compact heads for use on turbine cleaners that has yet been brought out.

The head is attached to the turbine proper by a coupling and an adapter. As will be noticed from Fig. 2, a solid steel spider, *a*, screws directly into the coupling *b* and furnishes a substantial support for the swinging arms *c*, which are fastened thereto. These arms are also of steel, and are so arranged that they will swing the full diameter of the tube and bear against the surface steadily under the influence of centrifugal force or yield readily if a constricted section of tube is encountered. Four cutter wheels are attached to each swinging arm. The forward set *d* is of the cone pattern, and is the first to attack the scale and loosen it. Each cone cutter is then followed by three star cutters *e*, which by cutting in a different path remove the scale down to the metal leaving a bright polished surface.

The ease with which new cutters can be inserted is probably the most important feature of this head. The cutter pin *f* can quickly be removed by a wrench, and all of the cutter wheels taken out. Should it be necessary to take the entire head apart, all that need be done is to unscrew the spider from the coupling. This permits the three arm pins *g* to drop out of their bearings and the whole head is dismantled. There are no rivets or small parts used in the construction of these heads, and it is but the work of a minute to remove one or more of the pins and insert as many new sharp cutters as may be required. This keeping the head equipped with sharp cutters results in a marked saving in the time necessary to remove a given amount of boiler scale from the tubes. This ability to remove the scale quickly and put the boilers back in service again is a decided advantage in plants where all the boilers are in service during a portion of the day and forced to the limit of their capacity.

The construction of the head is compact and heavy, and the flywheel effect of a compact head like this is very noticeable. When exceptionally hard scale is encountered it is only necessary to back the cleaner out a little and allow the head speed up. When it is again forced against the scale it is generally found that the cleaner will eat its way through without any further trouble.

Tests of Tungsten Lamps.—Bulletin No. 33 of the Engineering Experiment Station of the University of Illinois, Urbana, Ill., contains a report of a series of tests made by T. H. Amrine and A. Guell upon tungsten lamps of the 25-watt size having filaments made by the colloid, deposition and paste processes and mounted according to different methods. The tests show what may be expected from the low wattage tungsten lamps now on the market as regards life, maintenance of candle power and efficiency under all conditions of voltage, fluctuation and vibration. The influence of the mode of mounting the filaments upon the life of the lamps when subjected to vibration is made evident, and curves are given showing the progress of bulb discoloration for each of the three types of lamps.

Steam Turbines for Marine Use.—Although the first steamer equipped with turbines was put in service as recently as 1901, there are now 64 vessels carrying this equipment, with an aggregate horsepower of 603,200, according to statistics recently gathered. It is estimated that not less than 120 tons of weight is saved in the boiler room of the largest of the turbine propelled liners because of the lower steam pressure employed in their operation.

A COMMERCIAL FUEL BRIQUETTE PLANT.*

The Operations of the Solvay Process Company and the Semet-Solvay Company at Detroit, Mich.

BY W. H. BLAUVELT, SYRACUSE, N. Y.

The subject of fuel briquetting has attracted much attention on the part of engineers and investors for the past 15 or 20 years, and especially in recent years, during which a number of plants have been built, with more or less commercial and technical success. Our technical literature contains numerous descriptions of certain processes and discussions of the industry in general. For a history of the development of the art in the United States, and for descriptions of many of the processes which have been tried, reference may be made to the files of our *Transactions* and, for more recent information, to a paper by C. T. Malcolmson, read before the first annual convention of the International Railway Fuel Association in June, 1909. The purpose of the present paper is to describe the briquette plant of the Solvay Process Company and the Semet-Solvay Company, at Detroit, Mich., which, after a period of long and costly evolution, is now operating satisfactorily on a commercial basis. I believe that it will be of interest to some of our members to have the details of operation, power consumption, labor, &c., as worked out on a practical and commercial scale in a going operation.

The briquette industry has had a somewhat checkered career in the United States, and much the larger portion of the failures has been due entirely to commercial causes. It seems axiomatic to say that before undertaking the installation of a plant for manufacturing briquettes it is necessary that the local situation should be carefully examined: First, to determine the kind of briquettes, if any, the local market will consume; that is to say, whether the available fuel supply is such that briquettes would be a welcome addition, and whether the most promising field is the industrial or the domestic market. Second, if there is an available supply of raw material, as coal, coke, pitch, &c., which can be worked up into briquettes that will meet the market conditions and can be obtained at a price that will leave a margin for cost of manufacturing and a suitable profit. If this preliminary investigation does not result satisfactorily, the manufacturer should carry his plans to another place. Although these requirements are axioms of ordinary business prudence, yet neglect to observe them has been the cause of the failure of many undertakings, resulting often in the loss of the entire capital invested.

The Process and the Product.

The next step is the selection of the process of manufacture best adapted to the materials at hand and the quality of briquettes to be produced. A number of different processes and briquetting presses have been developed both in Europe and in the United States.

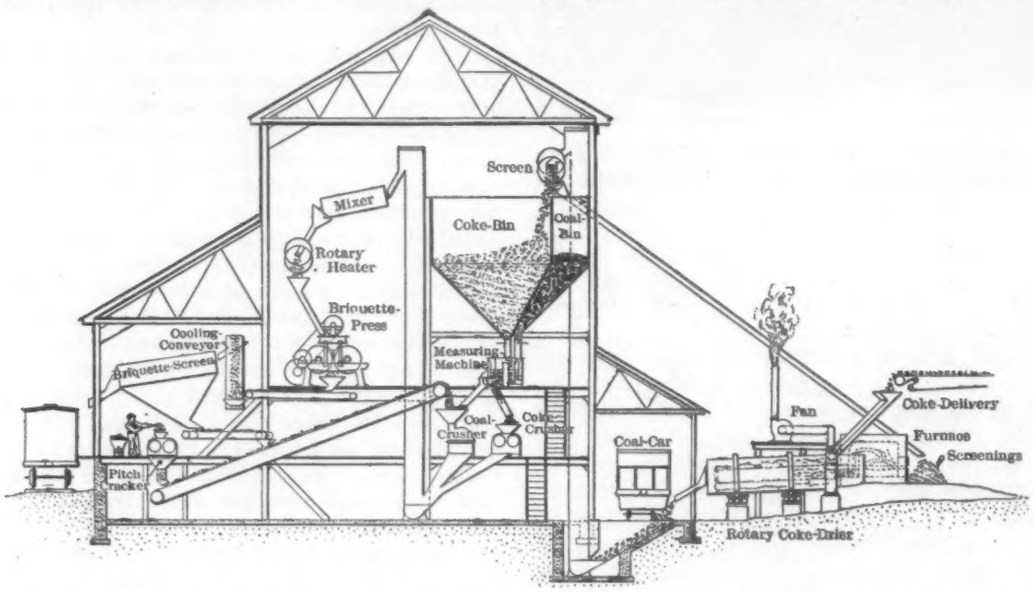


Fig. 1.—Diagram Showing the Arrangement of the Fuel Briquette Plant of the Solvay Process Company and the Semet-Solvay Company, Detroit, Mich.

In Continental Europe the manufacture of briquettes has reached large proportions and has become an important industry. The usual shape of the European briquettes is that of a rectangular block with round edges, weighing from 10 to 0.5 kg., or less. The larger sizes, which are usually broken up before firing, have the advantage of greater convenience in storing. For household purposes the housewife patiently breaks up the large briquettes with a hammer, but not having been accustomed to prepared sizes of anthracite, the annoyance, dirt and waste caused thereby are not realized. The smaller briquettes, usually of the eggette form, are largely used, especially in Belgium and parts of France.

There is a sharp line in manufacturing between the eggette and other forms. The eggettes are made on rotary presses, the coal and binder being pressed between the faces of two broad wheels or rolls having faces which are cupped out to receive and compress the briquettes into form. Generally speaking, it is not practicable on these rotary presses to produce briquettes larger than about 6 oz. in weight. On the other hand, the capacity of the reciprocating presses, which are used in making the larger briquettes, falls off rapidly as the size decreases, and it is usually not commercially economical on these presses to make briquettes which weigh much less than 1 lb. each. Some forms of press have been developed, notably in the United States, which in a measure combine the features of the rotary and reciprocating presses, and

* A paper read at the Pittsburgh meeting of the American Institute of Mining Engineers, March 2, 1910.

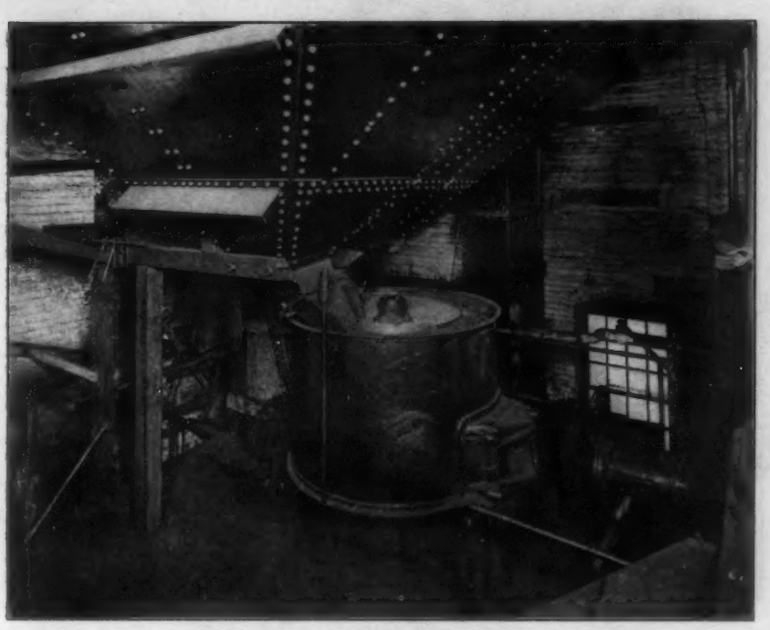


Fig. 2.—Storage Bins and Machine for Delivering Measured Proportions of Coal and Coke.

which would produce briquettes of intermediate size between the European rotary and the reciprocating press. These machines, however, have not been fully developed to commercial success.

Raw Materials and Binder.

In planning for the Detroit plant the domestic market appeared the most promising, and therefore a rotary type of press was selected which would produce small briquettes, or eggettes, each of about 2 oz. weight. After much experiment, in which it was learned that a good many things must not be done and that a few points were absolutely essential to the success of the operation, the plant was developed as it now stands.

The raw materials used are coke-breeze from an adjacent coke oven plant and dry noncaking coal from either the Hocking Valley or the Jackson Hill districts. These materials are used in equal proportions, by weight, mixed with from 8 to 9 per cent. of the binder. Coke breeze appears to require somewhat more binder than coal; perhaps on account of its porosity, which allows the binder to be absorbed into the cell structures without useful effect. Probably further experience will result in reducing the percentage of binder used. Coal tar pitch was selected as the binder, since experience has shown that, broadly speaking, it is the only throughly successful binder, generally obtainable at a moderate cost, which can produce a waterproof briquette.

Two processes are in general use, one using soft pitch, the other hard pitch. In the former the pitch is melted by steam heat or in an oven fired with coal or other fuel and mixed with the solid fuel while liquid, while in the latter process the pitch is made hard enough to permit of its being ground to a fine powder. In practice this latter means that, adopting the usual tar distiller's test, the pitch should be somewhat harder than can be chewed in the mouth without fracture after the pitch has been permitted to reach the temperature of the mouth. Unfortunately, no more scientific method of testing the hardness of pitch has been agreed upon as yet. The whole subject is in a rather chaotic stage, so the old chewing test is still largely employed.

The hard pitch method was selected for the Detroit plant partly because the soft pitch methods are always a source of danger from fire, but mainly because it is believed that the hard pitch method is the one which should be developed, with a view to obtaining the pitch at the lowest price delivered at the briquette plant. Hard pitch is more easily transported, either in very cheap packages, or, in cold weather, in bulk, and it can be produced at lower cost, since a larger portion of the more valuable oils contained in the original tar have been removed. Possibly the hard pitch method requires a slightly larger quantity of binder with some coals, but the lower cost at which it can be manufactured more than offsets this objection, and it also has the advantage of producing less smoke in combustion.

Detail of Operations at the Detroit Plant.

The accompanying diagram, Fig. 1, shows the arrangement of the different parts of the plant.

The process as at present conducted is essentially as follows: The coal is unloaded into a track hopper and elevated to the coal bin. As slack coal is always used, no preliminary crushing is necessary. The coke breeze usually contains considerable moisture, so in order to maintain constant conditions the breeze is dried in a rotary drier before being elevated to its storage bin. The coal and coke are brought together from the bins into a measuring machine, Fig. 2, which delivers the two materials in any desired proportion to a hammer mill of the Jeffrey or Williams type, Fig. 3, in which the mixture is finely ground. The pitch which meets the coal and coke in this mill is brought from the pitch storage shed by a pitchman, who breaks it into pieces of convenient size for feeding to the pitch cracker. This cracker consists of a pair of rolls, 16 in. in diameter and 12 in. face, with small V-shaped corrugations, running at a speed of 85 rev. per min. These rolls crush the pitch to about ⅜ in. in diameter and give no trouble unless the pitch employed is too soft to retain its brittleness at the temperature of the atmosphere. The crushed pitch falls from the rolls into a small hopper, from which a screw conveyor, which acts as a measuring machine, delivers a definite quantity of

Fig. 3.—Hammer Mill for Pulverizing the Coal and Coke.

pitch on to a small belt conveyor, which in turn discharges the pitch into the mouth of the hammer mill, as above stated.

By grinding the coal, coke and pitch all together in the hammer mill the three materials are thoroughly mixed and opportunity is given for each particle of the coal and coke to receive a coating of pitch powder, which, of course, is the theoretical condition to be striven for. Practice has shown that in pulverizing coke breeze the wear on the hammers of the mill is too great, and it is planned to install a small pair of chilled iron rolls for pulverizing the coke, leaving the hammer mill for the coal and pitch. The pulverized coke, coal and pitch are delivered direct to an elevator boot, which raises the mixture to the top of the building. From this elevator the mixture is conveyed in a rotary conveyor, in which the different ingredients are thoroughly mixed, to the rotary heater, Fig. 4, consisting of a cylinder 40 in. in diameter and 21 ft. long, set at a slight inclination. By the revolution of this cylinder the mixture passes from the upper to the lower end and is thoroughly mixed thereby. The cylinder is also heated to a temperature of about 80 degrees C. by superheated steam introduced through a perforated pipe extending the length of the cylinder. This steam is superheated by the waste heat from the coke breeze drier. In this manner the several components have been accurately and uniformly proportioned, pulverized, mixed and heated to a controlled temperature; also a small quantity of water has been introduced, which is desirable to insure a pliant and readily moldable material for the press. In some processes a vertical cylinder with stirrers is employed instead of a horizontal rotating cylinder, the mix being heated with superheated steam in a similar way.

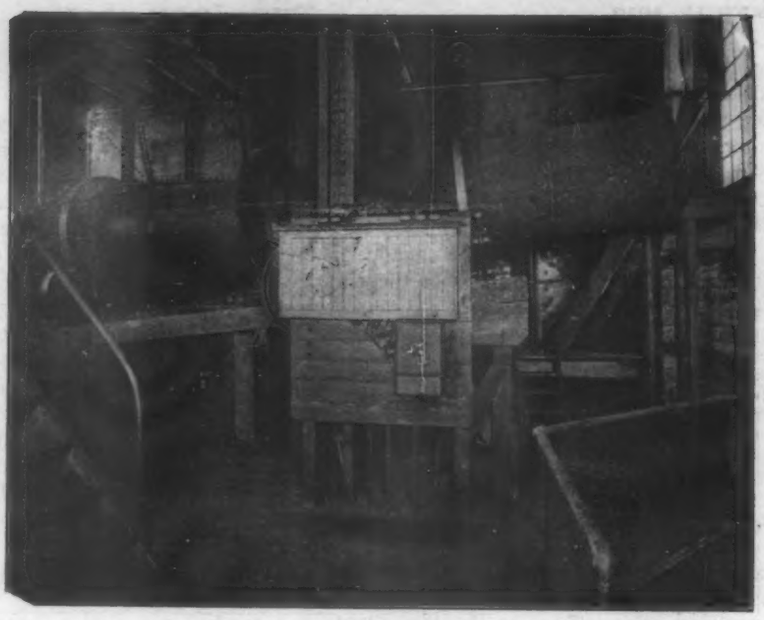


Fig. 4.—Rotary Heater and Mixer. The Superheated Steam Enters at the Left Hand End.

From the mixing cylinder the material is delivered by a short chute to the feed box over the rotary press. The press used at this plant, Fig. 5, is of French manufacture and of the standard Belgian type. It consists of a heavy frame supporting two rolls, each of which carries in the middle a gear having 7-in. face and 2.5-in. pitch, and on each side of the gear a steel tire, 5.25 in. wide on the face by 2.5 in. thick. These gears and tires are accurately fitted on to the drum or roll and keyed and bolted to place. The faces of the tires are hollowed out or cupped into recesses about 2.25 in. long and 1⅞ in. wide. There are three rows of these cups, arranged as closely as possible, so that each tire contains 207 cups. The rolls are accurately registered, so that the cuppings in the adjacent tires shall produce the egg shaped briquette, the shape and dimensions of the cuppings determining the form and weight of the briquettes. Provision is made for turning up the faces of these steel tires as they wear and for cutting out the cups, so that the life of the tires may be thereby prolonged. It is found that the wear is much greater with coke breeze than with coal alone, and it is proposed to substitute rolls with a chilled iron face in place of the steel. It has been found in our experiments that even the alloy steels, especially designed to resist wear, are not as satisfactory as chilled cast iron. The cutting action of the sharp particles of coke wears the best manganese steel, for example, perhaps even more rapidly than ordinary tool steel.

Adjustments are provided on the frame of the press which allow the rolls to be brought together as the tires wear or are dressed down. The rolls are driven by means of a pinion engaging one of the pair of gears. The pinion shaft in turn is driven through gearing by a belted motor. The belt affords a convenient safeguard in case of foreign material getting between the rolls and blocking them. If a direct drive is used, carefully designed breaking pins are essential.

The mix which has been delivered into the feed box is constantly stirred therein by rotating paddles and fed down to the rolls through two chutes, specially arranged with sides which may be moved in parallel, thereby controlling the feed of the mix to the rolls. It is essential to the production of uniform briquettes that, in addition to the mix being uniform in composition and temperature, the quantity delivered between the rolls must be accurately controlled, since it is the resistance of the material itself which determines the amount of pressure under which the briquette is produced.

From the press the briquettes fall on a conveyor belt and are delivered to a cooling conveyor outside of the building. This cooling conveyor is a slow moving rubber belt of sufficient length to permit the briquettes to cool sufficiently so that the pitch will harden and give strength to the briquette to resist breakage as it passes through the screen and falls into the railroad car. At some plants the cooling conveyor is constructed of a woven wire belt, which would seem to be advantageous in that it gives greater access of air to all sides of the briquettes. When the briquettes have been sufficiently cooled to acquire the necessary toughness they are delivered from the cooling conveyor to a rotary screen, which separates out any fine material and knocks off any fins which may adhere to the briquette on account of wear of the rolls. From the rotary screen the briquettes fall into railroad cars for shipment, or into storage piles. A small conveyor returns the fine unbriquetted material and the fins to the plant and delivers it back to the hammer mill, so that it is pulverized and thoroughly mixed with the new material.

Power Requirements.

The capacity of this plant has not yet been fully developed. It has been brought up to 9 tons per hour and it may reach 10 tons. The main features of the plant are, however, arranged to have a capacity equal to the output of two presses, and it is the purpose, as the market develops, to add the second press. This addition would result in a very material reduction in the cost of operation, since the labor required will be but little more than at present—about two more men. The power required for operating the elevators, conveyors, &c., and the repairs on these parts of the plant, will be but little more than at present, when the ton-

nage has been doubled. Probably the power required and the wear on the pulverizing mills, presses and some other parts will be more nearly in proportion to the tonnage. An examination of the costs given below, based on the output of one press and two presses, shows very clearly the effect of output on the cost of briquette manufacture.

Repeated readings have been made of the power consumed in the different parts of the plant, with the following average result:

Motor driving.	B.h.p.
Breeze conveyor to drier	1.50
Breeze drier and ventilating fan	2.85
Pulverizing mill	22.00
Elevator shafting and rotary mixer	10.00
Briquetting press	25.00
Total	61.35

The press motor also drives the cooling conveyor, rotary screen, pitch cracker and conveyor.

The consumption of steam in the rotary heater and mixer depends partly upon the temperature of the atmosphere and partly upon the quantity of binder and its melting point. Tests at the Detroit plant, extending over a number of days, show a consumption of 206 lb. of steam per ton of briquettes produced. This result was during a period of somewhat slow operation. No tests have been made during a period of steady running at full speed, but the above steam consumption per ton of product would undoubtedly be decreased by a larger output. The superheating of the steam is desirable in order to maintain it in a dry state and prevent the addition of too much water to the mix. The experiment was tried of heating the outside of the rotary mixer and heater with a gas flame, but the use of superheated steam seems to be more satisfactory.

Operating Costs.

The labor on a plant similar to the one described is approximately:

	Cost per hour.
1 foreman	$0.50
1 pressman	0.26
1 oiler, breeze drier and conveyor man	0.18
1 pitch man	0.18
1 briquette loader	0.19
2 laborers, at 17 cents	0.34
Total	$1.65

When producing 9 tons of briquettes per hour the labor cost becomes 18.3 cents. Two presses would double the output, but would only require two more men at 18 cents and a second pressman at 26 cents per hour, which would bring the labor cost to 12.6 cents per ton.

Fig. 5.—Briquette Press. The Feed Control Levers to One Pair of Rolls Are Shown Directly Under the Feed Box.

The use of coke breeze increases the wear on all apparatus with which it comes in contact, but especially on the briquetting rolls. The question to be determined in each case is whether the breeze can be obtained at a cost sufficiently low in comparison with coal to offset the increased repairs due to its use. In addition, coke breeze has the advantage of being smokeless, so that its use reduces the smokiness of soft coal briquettes. The difference in cost of maintaining the briquetting rolls with and without coke breeze is so great that two cost sheets are given below, which will illustrate the approximate cost of manufacturing briquettes under these two circumstances in a plant similar to that here described, producing 9 tons of briquettes per hour. If the plant were operated on the basis of the larger production obtained from two presses, it would be safe to estimate a reduction in these two costs of, say, 10 cents per ton.

	Cost per ton of product. Using 50 per cent of breeze.	Using 100 per cent. of coal.
Labor	$0.183	$0.183
Power at 1.25 cents per kw. hour	0.072	0.072
Steam, 206 lb. at 0.5 cent per hp. hour	0.034	0.034
Breeze drier and superheater fuel	0.03	0.011
Miscellaneous supplies, oil, waste, lights and water	0.03	0.03
Repairs on rolls	0.101	0.035
Other repairs	0.05	0.035
Total	$0.60	$0.40

To obtain the total operating cost of a plant such as has been described, and operating under similar conditions, the cost of the pitch for binder and of the coal, coke breeze or other fuel used, must be added to these figures.

In order to have an illustration of such costs, let us assume that suitable slack coal can be obtained at $2, coke breeze at $1 and pitch at $8 per ton, delivered at the plant. Since, as above pointed out, the use of breeze requires somewhat more binder, we will assume the use of 7.5 per cent. of binder with the coal and 9 per cent. with the mixture of coal and breeze:

	Cost of 1 ton of briquettes. All coal.	Equal parts of Coal and breeze.
0.455 ton coal at $2	.....	$0.91
0.925 ton coal at $2	$1.85	
0.455 ton breeze at $1	.....	0.455
9 per cent. of pitch at $8	.....	0.72
7.5 per cent. of pitch at $8	0.60	
Cost of briquetting, as above	0.40	0.60
Total	$2.85	$2.685

Many coals can be briquetted with less than the above quantities of pitch and, of course, the costs of coal and coke breeze vary at every plant, but the substitution of local prices in the above tables will give approximately the cost of briquettes in a plant having about the capacity of the one described. In larger plants the cost of operation is less, and with briquettes of large size for industrial purposes the cost would be materially reduced.

In contemplating the erection of a plant, not only must a press be selected suited to the material to be treated and also to the kind of briquette demanded by the available market, but it must be remembered that a briquette plant includes much more than the mere press. To insure economical operation, the preparation and handling of the material must be carefully studied and planned for, and the whole combination of driers, bins, elevators, measuring machines, crushers, mixers, heaters, conveyors, &c., must all be combined with the press into a single effective and economical unit which will insure a uniform pro-

portioning of the materials, their thorough and intimate mixture, their heating to a sufficient and uniform temperature, and their delivery to and removal from the press at a constant and reliable rate. If the various units entering into a briquette plant are thus successfully combined with careful economy of power and convenient arrangement, so that the labor is maintained at a minimum, a briquette plant should be a reliable and assured source of profit in locations where a satisfactory raw material and market for the product obtain. While the processes are simple and easily understood, it is essential that the different conditions be rigidly maintained, and usually it is only after the press man and other more important operatives have attained certain instinctive recognition of the conditions that the plant becomes thoroughly successful.

Pipe Jobbers' Convention.

The National Association of Jobbers of Wrought Pipe and Fittings Meets at Pittsburgh.

The National Association of Jobbers of Wrought Pipe and Fittings, formed a year ago in Pittsburgh, held its first annual convention at the Fort Pitt Hotel, Pittsburgh, March 14, 15 and 16. Owing to illness, President A. E. Ford of the Ford & Kendig Company, Philadelphia, was unable to attend, and in his absence Vice-President C. H. Simmons of the John Simmons Company, New York City, presided. In opening the convention Mr. Simmons stated that the growth of the association, which now numbers about 196 jobbers, was, in the main, made possible through the untiring efforts of its absent president.

The morning session of the first day was an open one, the attendance including numerous representative manufacturers. Vice-President Simmons read the address prepared by the absent president, which reviewed the work of the year, and showed that the officers of the association had been most active in looking after the interests of the members. Evidently, the first year of the association has been prolific of results, proving the value of such an organization. The address was long, but most interesting.

The report of Secretary Thomas A. Fernley ably supplemented the president's address, giving many details of what had been accomplished.

W. E. Frick of the Frick & Lindsay Company, Pittsburgh, chairman of the local Entertainment Committee, briefly outlined what it had arranged for the visitors. Various manufacturers and jobbers spoke interestingly on the amount of business being taken and the prospects for the future. The reports covered conditions in various sections of the country, including New York, Philadelphia, Chicago, St. Louis, Helena, Los Angeles, San Francisco, Baltimore and the Southwest. In the afternoon an executive session was held.

Tuesday was devoted to routine work, and the reading and discussion of papers.

At Wednesday morning's session Cleveland, Ohio, was selected as the city in which the next annual convention will be held. All the present officers were unanimously re-elected and high tribute was paid them for the efficient service rendered the past year.

Visits were arranged to the works of the National Tube Company, at McKeesport, Pa., and of the Youngstown Sheet & Tube Company, at East Youngstown, Ohio.

Gayley Dry Air Blast in Austria.—Julian Kennedy, Axel Sahlin & Co., Ltd., Brussels, Belgium, have arranged to install the Gayley dry blast process at the works of the Oesterreichische Berg & Huettenwerks Gesellschaft in Teschen, Austrian Silesia. This company has two blast furnaces of a daily capacity of 200 tons each.

A Tariff Deadlock with Canada.

Prof. Henry G. Emery, chairman of the Tariff Board of the Treasury Department, and Charles M. Pepper, expert of the Bureau of Trade Relations in the State Department, returned to Washington last week after holding a conference at Ottawa with representatives of the Canadian Government on the tariff relations of the two countries. No agreement was reached, however. In some quarters doubt is expressed of the reaching of an understanding before April 1, when under the Payne Tariff act the President must make proclamation of maximum rates on Canadian imports in the absence of the granting of concessions by Canada. What is asked of Canada is the granting to the United States of the low or intermediate Canadian tariff rates recently granted to France and that are now given by Canada to a number of other countries. It was found by the representatives of this Government that the reductions on Canadian imports made by the Payne tariff were not understood in Canada. A better understanding on both sides resulted from the conference, but in return for the preferential rates asked by this Government Canada expects something more substantial than merely the suspension by Presidential proclamation of the maximum rates established in the Payne tariff.

At Ottawa the representatives of the United States showed that on imports from Canada into the United States in the fiscal year 1909, the average ad valorem rate on dutiable and free imports was only 11.02 per cent. and on dutiable imports 19.4 per cent. On the other hand, it was shown that the Canadian average ad valorem rates on free and dutiable imports from the United States was 12.8 per cent., and on dutiable imports 24.9 per cent. Under the Payne tariff the reductions for the fiscal year 1909 would have amounted to $1,000,000 on Canadian imports to the United States, while the reductions in Canadian duties on goods from this country, under the concessions now asked, would have been about $800,000.

The Washburn Wire Company.

The Washburn Wire Company, says the Boston *News Bureau*, reports a substantial increase in earnings during its fiscal year ended December 31. Profits totaled $510,471, which compares with $309,021 earned in 1908, and is slightly above the 1907 record of $510,379. After payment of $175,000 for the 7 per cent. preferred dividend, the balance on the common stock equals about 26.8 per cent. on that issue. Of this balance, $263,398 was applied to eliminate the patents, good-will and trade account, and the remainder of $72,072 credited to profit and loss. The December 31 balance sheet compares as follows:

Assets.

	1909.	1908.
Real estate	$1,300,110	$1,221,212
Machinery and tools	1,538,624	1,348,947
Patents, good will and trade	.....	263,398
Merchandise	1,041,906	1,176,461
Accounts receivable	831,573	856,550
Notes receivable	61,643	76,383
Investments	237,904	34,800
Cash	115,540	44,015
Construction	.....	211,040
Totals	$5,127,303	$5,232,808

Liabilities.

Preferred stock	$2,500,000	$2,500,000
Common stock	1,250,000	1,250,000
Accounts and notes payable	1,070,530	1,248,108
Profit and loss	306,773	234,700
Totals	$5,127,303	$5,232,808

The Standard Time System in the Bullard Works.

Manufacturers who have changed over from piece work to any form of the premium system have usually found that employees regard the change with some suspicion, in their failure to comprehend the profit sharing principles which are involved. The Bullard Machine Tool Company, Bridgeport, Conn., has recently inaugurated the Standard Time system, which replaces piece work. It is probably no heresy to state that piece work as commonly practiced affords some ground for discontent. So does the Standard Time system or premium system, unless the principle is adhered to that a price or a time once established shall stand. In piece work this is impossible; an error in agreed price might mean a prohibitive cost and a profit to employees which would not only be beyond their normal earning capacity, but a source of discontent on the part of other workmen and of the man himself, because in the course of time he would have to do other work at a far less wage.

With piece work, where a number of operatives do the same work, the more skillful hold back out of friendliness to their associates, in the fear that too great a production would mean a cut in price. On the other hand, with a premium system, increased production beyond the standard set by the employer means a sharing of the resultant profits between him and the workman.

In the Standard Time system, as practiced at the Bullard plant, a day's wage is guaranteed, and a standard time for doing each piece of work is set. If the workman does the task in that time, it is recorded as 100 per cent. efficiency, and the man receives a bonus of 20 per cent. of his wage. If, to illustrate the principle, he does it in one-half the standard time, he is rated at 200 per cent., and he receives 120 per cent. in addition to his wage. If, for example, he does the work in the standard time of one hour, and his guaranteed wage is 15 cents, his bonus is 3 cents and the wage cost is 18 cents. If he does the work in half an hour, he receives 33 cents. But the machine does twice the work, and the employer's advantage is easily reckoned, as well as that of his employee.

A certain complexity of the system stands between the management and its people. Once its principles are understood by the latter, and they grasp the fact that the original price will not be lowered, the result is usually accepted by all as beneficial. In the Bullard shops workmen in one or two cases have even been permitted to name their own time for certain work, the purpose being to remove unfounded suspicion.

To elucidate better the policy of the company, President E. P. Bullard, Jr., issued a statement to the employees, which is worthy of study by those who are interested in systems of wages other than hourly payment, as follows:

As there seems to be a misunderstanding regarding the introduction of the standard time system, we feel that the following explanation is necessary:

FIRST.

A. Standard time differs in no way from the piece work, except that it gives a "time price" instead of a "money price" on the work performed.
be reduced as long as manufacturing conditions under

B. The company guarantees that standard time shall not be reduced as long as manufacturing conditions under which standard time is set remain the same. The company has heretofore reserved the right to cut piece work prices whenever necessity arose.

C. As the company agrees to maintain standard times, as outlined in section B, every precaution is taken to set such standard times on a fair basis, both for the workman and the company. No standard time is set until previous records have been gone over, the foreman has been consulted, and the conditions under which the work is to be performed have been carefully studied. The writer personally approves every standard time which is given out.

SECOND.

A. Under the standard time system every workman is guaranteed his day rate, *no reduction in wages being made for failure to turn out work in standard time.* In other words, a bonus is offered for accomplishment with no penalty for failure.

B. In setting standard times it has been our endeavor to make time allowances which will permit a workman to earn as much as he has heretofore earned under the piece work system. We point out, however, that he is not limited in the amount of his earnings in any way.

C. It is for the company's interest, as well as the man's, that the efficiency of the shop should be as high as possible, which means that the earnings of the men will be high. This will be obvious to one who bears in mind that the equipment in this shop is expensive; that the overhead charges are necessarily high, and that the more that can be got out of this equipment the more the company can afford to pay for the work.

We also take this opportunity to point out that it is our aim to produce the highest grade of machinery that can be manufactured, and that all standard times will be based on the understanding that nothing but first-class work is to be turned out.

This business has been established and continued through the past 30 years on the basis of a *square deal.* Our product is sold on the distinct understanding that it is first class and will make good. We have always stood back of our machines prepared to maintain this reputation.

It is our intention to continue to run the shop on this same basis—that is, a square deal. You may rest assured that any failure on our part to carry this out is through a misunderstanding or oversight of some employee. We believe the standard time system, with its noncutting guarantee, to be the fairest way we know of for the payment of labor. Your co-operation will react to your advantage.

The National Machine Tool Builders' Association.

The spring meeting of the National Machine Tool Builders' Association will be held May 24 and 25 at Rochester, N. Y. The meeting will be one of more than ordinary importance, as the last six months has been an unusual period in the machine tool trade, and many questions pertaining to machine tool making and marketing have come up as a result of the heavy demand. It is thought that the question of standardizing electric motors used in connection with machine tools will be thoroughly threshed out, and a report will be heard from a committee continued at the fall meeting of the association to co-operate with a committee from the electric motor manufacturers on that subject. The demand for machinists has been so great during the last few months that the need of creating more machinists through the apprenticeship system has come forward, and that question in connection with industrial education will have an important part in the meeting.

It is probable that a committee from the American Supply & Machinery Dealers' Association will wait on the convention, with a view to adjusting a number of questions that have come up between manufacturers and dealers since the fall meeting of the association. The machine tool situation is entirely changed as compared with the conditions that existed last fall. Prices are higher and machine tools are scarcer, and in consequence relations between the dealers and manufacturers have naturally changed on some points, in sentiment at least. As the annual election of the association occurs at the fall meeting of the organization, the entire time during the two days' session will be given up to the presentation of papers and the discussion of matters relating to the trade.

The regular monthly meeting of the Engineers' Society of Western Pennsylvania, held in the Fulton Building, Pittsburgh, on the evening of March 15, was addressed by Dr. William H. Tolman, director of the Museum of Safety and Sanitation, New York City. Safety appliances applicable to machinery commonly found in manufacturing plants in the Pittsburgh district were illustrated and described and approved methods for securing sanitation in factories and mills were presented.

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Wire and Wrought Pipe as New Outlets for Steel Works.

With the brevity with which important matters are often treated in the annual reports of large corporations, a steel company report issued this week says: "Rod and wire mills are in course of construction and will broaden the market for Bessemer steel, the use of open hearth rails having reduced the demand for Bessemer for that purpose." The extent to which the railroads have called for open hearth rails, and, what is perhaps more important, the great fluctuations in the volume of rail orders, have furnished similar occasion for action by other steel companies, and more is likely to be heard of diversification in finished products due to new influences that have entered into the rail trade. In the Eastern rail trade just now the great rail capacity provided at Gary is probably more influential than any other factor, while time will be required to show the full extent of its bearing upon the rail situation. What is perfectly patent is that the Western States, in which the possibilities of railroad development are greatest, and in which renewals will also be important, will no longer need to secure any portion of their rail requirements from Central Western or Eastern mills, which have for a good many years depended in part on this overflow. It is also evident that the capacity of rail mills east of Ohio is much in excess of what is needed to care for demand naturally tributary to such mills.

In a previous article (*The Iron Age*, January 6, 1910, page 64) dealing with the new competition coming forward in certain finished material lines, wire and wrought pipe were mentioned as products for which new capacity is being provided by companies not heretofore engaged in their manufacture. The growth of consumption in these two lines has been marked, and this fact seems to have been appreciated, as well as the considerable proportion of both coming from subsidiaries of the United States Steel Corporation. In wrought pipe the increase in 10 years has been especially worthy of note. In 1890, when the consolidation in that industry was formed, the output of its subsidiaries was about 420,000 gross tons, and it was estimated that outside companies produced about 200,000 tons. While the figures for last year have not been published, the output of the leading interest, which now contributes about 55 per cent. of the total, may be estimated at 1,100,000 tons. Thus there is indicated a consumption three and one-third times that of 1890.

In wire products, while the increase in the same period has not been so rapid as in pipes and tubes, there are indications of a very considerable growth of new competition. In 1892 the first full year of the Steel Corporation, its wire subsidiary produced 1,122,809 gross tons of wire and wire products, out of a total of something less than 1,500,000 tons, leaving out rods sold that were not drawn into wire. In 1909 it is estimated that the same subsidiary produced over 1,700,000 tons of wire products, and that the output of other companies amounted to about 500,000 tons.

It is evident that the way in which the wire trade has maintained itself in times of leanness, as well as in the fat years, and its freedom from the influences that have caused such marked fluctuations in the demand for rails, and of late years for plates for steel cars, have commended it to steel companies in search of new outlets. At the same time the exceptional expansion in the demand for wrought pipe—in part, apparently, at the expense of cast iron pipe—has attracted to it other producers who were dealing with the problem of rolling mills only partly occupied, or who were looking for suitable lines for new capacity both steel making and rolling.

A Record Supply of Pig Iron.

Pig iron was produced in this country in February at a rate greater than had ever been reached, or roundly, with an allowance for charcoal iron, at 31,650,000 gross tons per annum. In January the rate was about 31,100,000 tons and in December 31,450,000 tons. Whether March will maintain the February rate is questionable, since the daily capacity of coke and anthracite furnaces active at the opening of the month was 84,854 tons, whereas the daily rate of production in February was 85,616 tons. It becomes a matter of interesting speculation, indeed, in view of the chilling of the high hopes entertained for 1910, whether the high rate of output for the year has now been passed.

What has been commented upon through the seemingly unpromising conditions of the past two months is the way in which consumers of pig iron have taken forward for actual use the iron due them on contracts. So much of this iron was bought at prices below the level to which they were pushed at the end of the excited buying of the late fall that the decline of this year has not yet gone far enough to present serious temptations to defer contract shipments and pick up low priced offerings. In the absence of definite figures on pig iron stocks this fact indicates the fairly close approximation of consumption and production. Furnaces generally have been so occupied in supplying the demands of current consumption that the surplus accumulated has been but a small percentage of the unparalleled tonnage used up. It is hard to realize that in February the production was more than 40 per cent. above that of February of last year, and nearly two and one-third times that of February two years ago, and yet that so little metal is pressing upon the market.

With all our history of remarkable forward movements after periods of depression, it is not surprising that a question comes up of the ability of the country

to absorb pig iron at the present rate throughout the year. As for prices, there has been an assumption in some quarters that an advance of about $1 a ton in the ore cost of Northern iron would of necessity establish a higher level for the second half than for the first half of the year. That is a matter, however, in which the determining factors are far from being so obvious or so automatically operative. Some of them are yet to be developed out of uncertainties that are baffling to an unusual degree. The old law of supply and demand has had a way of upsetting all calculations based on cost sheet comparisons and it is still fully operative.

The Movement in Gold and Commodities.

The increased production of gold is inadequate to explain the steady increase in commodity prices in the past 10 or 12 years and cannot be considered more than one of several factors. The index numbers representing the average of various selected commodities indicate approximately that a low point in prices was reached in the middle of 1896. United States gold production in that year was $53,000,000, but it had averaged close to $35,000,000 in the 10 years preceding, and since then it has increased fairly steadily, to between $90,000,000 and $95,000,000 in each of the past four years. There have been wide divergences in the price movements of different commodities, clearly disclosing the influence of other and necessarily important factors. Thus, while the lowest prices of commodities on the whole were reached about the middle of 1896, the lowest prices of iron and steel were reached in the summer of 1897. It can be shown in detail, with pig iron, billets and finished iron and steel, that in each of the three years, 1896, 1897 and 1898, the lowest prices were in the summer, and that the low prices of 1897 were materially lower, from 10 to 20 per cent., than the low prices of 1896, while the low prices of 1898 were below those of 1896, although higher than those of 1897. The index number of commodities, however, shows slightly higher prices at the low point of 1897 than at the low point of 1896, and materially higher prices at the low point of 1898. Again, the 1907 high point in iron and steel prices was but a trifle higher than the 1902 high point, whereas commodities at large showed a much higher average in 1907 than in 1902. Finally, the commodity average is fully as high at present as at the high point of 1907, while iron and steel prices are materially lower all along the line.

Only the portion of our gold production which finds its way into money could affect values of commodities. If a large quantity of gold suddenly went into consumption in the industrial arts, or into utilization as jewelry, the influence could not be to advance commodity values. We are directed, then, to look into the supply of gold used as money. On July 1, 1896, there was, of gold coin and bullion in the United States Treasury and of gold coin in circulation, $557,000,000; at present there is about $1,650,000,000. Approximately this represents the country's gold production in the period, as that production was about $1,075,000,000.

That this correspondence between gold production and the increase in the visible supply is not the principal governing element is apparent from two considerations: 1. The total supply of money in the United States July 1, 1896, was $1,800,000,000, while the total supply at present is somewhat over $3,400,000,000, there being no relation between these figures and the visible supply of gold at the two times. 2. There have been wide fluctuations in the visible supply of gold from year to year, and over a longer period, due to the international movement.

One of the most striking instances of changes in the visible supply of gold in the United States occurred immediately after the middle of 1896, which the commodity index numbers show to have been a critical time. As noted above, the visible supply of gold July 1, 1896, was $557,000,000; a year later it had increased by $101,000,000, and another year brought an increase of $167,000,000, making a total of $268,000,000 in two years and giving a visible supply of $825,000,000 on July 1, 1898. Our gold production in the two years was only about $115,000,000. Whether there was a relation of cause and effect, the fact stands that about the middle of 1898 there began a great industrial revival, marking the termination of a five-year industrial depression, to which there had been nothing at all comparable since the similar depression of 1873-78. In a rough way this incident may be used to support the claim that the supply of gold affects industrial movements; but if so, the showing is not that the influence is from the domestic production of gold, but rather that it is from the international movement.

There is a popular impression that the international movement of gold follows the movement of merchandise, which is another way of saying that we conduct a merchandise business with foreign nations, which is largely barter, with a remainder which is settled in gold. That impression is incorrect in the main, the merchandise balance being merely one of several balances which are combined to furnish a net balance which is settled in gold. One can review the history of our foreign commerce for half a century and note as much divergence as correspondence in the respective movements of merchandise and gold. Up through 1873 each year showed excesses of merchandise imports and gold exports, while thereafter to 1882 there was a balance of merchandise exports with gold imports. This movement was in accordance with the impression referred to. After 1882 merchandise exports rose, while gold showed no movement; in 1887 gold imports exceeded merchandise exports, while in the following year merchandise imports exceeded gold exports, reversing the movement. Then, from 1890 to 1894, inclusive, there was a large favorable balance of trade, but there were gold exports at the same time. In 1895 the favorable merchandise balance of trade was small, but in all succeeding years it was unprecedentedly large; yet the gold imports were relatively small.

Of course, it is quite possible that the gold movement prior to the last quarter century did represent little else than the settling of our merchandise balance of trade; it matters little. It is quite certain that in the past quarter century the merchandise balance of trade can have been no more than one of several important factors, determining whether we should receive gold or be forced to export it.

It was noted that there was a sudden and very large increase in our visible supply of gold from July 1, 1896, to July 1, 1898, and that immediately thereafter came a great industrial expansion. It may now be noted that our foreign commerce showed a profound

change at the same time. In the fiscal year ended June 30, 1897, our favorable merchandise balance of trade was $286,000,000. In no previous fiscal year had it been so large, although in two calendar years, 1878 and 1896, it had slightly exceeded $300,000,000. However, in the following fiscal year, ended June 30, 1898, the favorable balance amounted to no less than $615,000,000, more than double the best shown in any previous fiscal year, and nearly double the best shown in any previous calendar year. This was a stupendous jump for a single year. It may be surmised, the visible supply of gold experiencing a large increase in the same time, that there were gold imports, but the fact is that the net gold imports in the fiscal year 1898 were only $105,000,000. They came far short of corresponding to the movement of merchandise, for they were only $60,000,000 more than in the preceding fiscal year, whereas the increase in the merchandise balance of trade from the one year to the next was $329,000,000.

These comparisons seem to indicate pretty clearly that the gold movement is not in harmony with the merchandising movement, the latter being one of several causes influencing the movement of gold. The principal other cause is, without doubt, the movement of securities. It may not be altogether presumptuous to conclude that as the time appeared to be getting ripe for a revival in industry in the United States in 1897 and 1898, there was heavy buying of our securities held abroad, and an import movement in them of no small magnitude, the securities being paid for in merchandise rather than in gold, or, perhaps, more strictly speaking, the import movement in securities shutting off a large part of the gold imports which otherwise would have been made to settle for the merchandise exports. It may, perhaps, be inferred also that the heavy merchandise exports in the fiscal year 1898 had an important part in producing the general trade revival.

It is patent that in all regions of thought at present there is much unrest and a feeling that a sweeping change in the affairs of men is taking place. There are various outbreaks; the college professors are predicting panics; the common people are talking of the "high cost of living," although but a few straws have been added to the load they carried in 1907; the iron trade is well nigh bewildered in an effort to understand its position, and organized labor has become exceedingly restless.

It is in view of this general unrest that the attempt has been made above to analyze some of the features of the past. Whatever is occurring now may be the culmination of a movement which has been in progress since the late nineties; and an effort to diagnose the present condition properly concerns itself, first, with the transitionary years preceding this period, and, next, with what occurred in the period.

Observing then that this period of prosperity immediately followed a sudden expansion in our favorable merchant balance of trade, with a moderately large import movement in gold, we may glance cursorily at what has occurred meanwhile. Using calendar year statistics, we observe that in 1899, 1900 and 1901 our merchandise balance of trade averaged nearly $575,000,000; that in 1902-7 inclusive it averaged well below $500,000,000, but was fairly steady; that in 1908 it was $636,000,000 and in 1909 $253,000,000. Apparently the showing was favorable up to 1909, but that showing is not conclusive, for the reason that in 1899, 1900 and 1901 our imports and exports combined were only a trifle above $2,000,000,000, while in late years they have been well above $3,000,000,000. It is well known that a portion of our apparent favorable balance of trade is not real, being made up of differences in valuations, freights paid to foreign vessel owners, &c., and the larger the total volume of commerce the larger is this portion of the apparent balance which is not real, so that on the whole the showing is not altogether favorable for the recent years. This may be relatively unimportant, but it is certainly very important that our apparent favorable balance dropped from $636,000,000 in 1908 to $253,000,000 in 1909, the smallest since 1895, a period of 14 years.

Turning now to the gold movement, we observe that in the calendar year 1898 we received a balance of $142,000,000 of gold. In the next seven years, through 1905, the annual balances were very small and practically balanced each other. Then in 1906 and 1907 we had large imports, $197,000,000 for the two years, which helped us along for a while, but in 1908 our net gold exports were $31,000,000 and in 1909 they were $89,000,000. The trends, both of gold and of merchandise, have been extremely unfavorable, and, noting that 12 years ago, when industry experienced such a remarkable revival, the trends were in the other direction, there is furnished additional argument for practicing the economy which of late has been preached in many quarters.

Manufacturers and Short Weights.

The chief of the National Bureau of Standards made the statement recently that "the people of a single Eastern State lose $40,000,000 a year on short weight on commodities purchased." The manufacturers of that State bear a considerable percentage of this loss. It is no new subject, but additional emphasis may well be given it. A certain element of mankind is given to selling on short weights, but usually the seller has to tamper with the scales to accomplish this. As scales wear they become inaccurate, but they favor the buyer. The knife edges of the balances become rounded, friction increases, and it takes a greater weight of goods to move the beam. This is a real source of loss in manufacturing plants where attention has not been given the matter. Raw material may be received in correct weight. It is worked into a finished product. The elements of labor and other costs are introduced, and it is then sold according to weights obtained on scales which are cheating the owner. Periodical tests and correction of factory scales prevent this sort of thing, and at the same time serve to place the owner in an advantageous position in disputes over weights, which on occasion may be no small matter in itself.

The Clinton Iron & Steel Company is making some important improvements and additions to its Clinton Furnace in Pittsburgh. This is the oldest blast furnace in the Pittsburgh district, having been originally built in 1859, but has been rebuilt several times. The improvements now to be made include the installation of two new heavy duty blowing engines; the high pressure engine being 44 and 84 x 60 in., and the low pressure engine 84 and 84 x 60 in. The engines are being built by the Southwark Foundry & Machine Company, Philadelphia. A new engine house is being erected.

On Three Iron Ranges.

Activity at Michigan Mines—A Large Stripping Contract.

ISHPEMING, MICH., March 12, 1910.—The Jones Furnace Company, of which John T. Jones is the head, has started development work in the Randville district, where it has under lease a large acreage of mineral lands. This field is some miles to the north of Iron Mountain, and since the discovery of a large deposit at the Groveland mine and the find of ore at the adjoining Breitung property it is considered one of much promise. Operating with a diamond drill, the Jones people have found ore at a depth of 100 ft. Apparently the deposit is of large proportions and the quality of the mineral excellent.

The Steel Corporation's Dober mine in the Iron River-Stambaugh district of the Menominee range is being prepared for more extensive production. The Dober is a fine property, with large reserves, and it boasts the only steel shafthouse at the western end of the Menominee. It will soon be sharing this distinction with the Mineral Mining Company's James mine, however. This latter property, which lies in the territory to the north of Iron River, and which contains a large deposit of very good ore, is being given an excellent surface plant. Northeast of the James mine, the New York State Steel Company is exploring the McFarland property, in section 13, 43-35, an option on which was taken recently. The diamond drill is being used. The Cleveland-Cliffs Iron Company, which recently encountered ore on the Erickson property, in section 21, 43-34, where it has been operating a diamond drill, has now installed churn drills and is proceeding with the exploitation of the tract systematically. The Erickson lies in the territory between Iron River and Crystal Falls. It is in that vicinity that the Munro Mining Company has recently demonstrated the old Chicagon mine to be a property of much promise. The Chicagon is in section 26, 43-34. The discovery of merchantable ore in the district has attracted increased attention to the region, with the result that a large number of tracts have been optioned latterly by various concerns, and a great deal of exploratory work is in sight for the coming summer. A spur line, the survey for which has already been made, will be extended to the Chicagon mine by the Chicago & Northwestern Company.

On the Marquette Range.

There is great activity in the Negaunee district of the Marquette range. More men are at work than at any time. The Cleveland-Cliffs Iron Company is operating the Maas, Negaunee and Lucy mines, the Steel Corporation the Hartford and the Regent group, the Jones & Laughlin Steel Company the Rolling Mill, the Republic Iron & Steel Company the Cambria and Lillie and the Breitung interests the Mary Charlotte and Breitung Hematite. In addition, the Breitung people are preparing to resume work at the old Milwaukee and Davis properties. The company already has 800 men on its payroll at Negaunee, and it will have increased this number to 1000 by the opening of navigation. The work of unwatering the Milwaukee and Davis is now being started. This operation will require probably 60 days. The mines are each 600 ft. deep. They are connected by drifts, and will be operated as one property.

Both day and night crews are now employed at the Lucy mine, which only recently has been restored to the active list. It was opened in 1870, and was operated until 1898; since then it has been active only at intervals, producing less than 100,000 tons the past dozen years. It still contains large deposits, and will send out a good sized output this season. There are two shafts, the deeper of which is down 400 ft.

Mesaba Range Developments.

Except in the way of repair work, little is being done at the Wisconsin Steel Company's Hawkins mine in the Nashwauk district of the Mesaba range. Stripping had been in progress until recently, and when the work was suspended for the winter several hundred thousand tons of ore had been uncovered. Pickands, Mather & Co., who are interested in a property a mile west of Nashwauk, have been doing some exploratory work there latterly, preparatory to outlining plans for the development of the tract.

Pickands, Mather & Co. are steadily expanding operations in the Embarrass Lake region in the eastern portion of the Mesaba. Two fine properties of this firm in that field, properties that to date have cost very large sums of money, are the Bangor and Syracuse, both of which have gone down in a quicksand overburden, and are exceptionally wet propositions. The mines this year will begin returning interest on the investment. The new town of Pineville, which has been established on a site between the two mines, will likely expand to a population of 1000 before the close of the year.

Another new eastern Mesaba shipper of Pickands, Mather & Co. this year will be the Hudson. This is an open pit property, and is served by a railroad line extending from the same company's nearby Mohawk mine. The latter was provided with a new shaft the past year, and is in position to make a good sized output this season. A prospective shipper is the St. Clair property of 80 acres adjoining George A. St. Clair's Spring mine and also controlled by him. It will be an open pit producer. The Hector and Ajax mines, transferred by the St. Clair interests to the Jones & Laughlin Steel Company some months ago, are both expected to ship ore this year. The Jones & Laughlin interests have added a number of properties to their Mesaba range holdings the past year, and will ship heavily this year.

A Mesaba mine that will be added to the Steel Corporation's shipping list this year is the Mississippi, in the Keewatin district, in the western portion of the range. The Mississippi has a shaft 8 x 20 ft. The Steel Corporation has had a great many diamond drills in commission for some time past, and it is the understanding that a number of important deposits have been found. The district will be served by the Great Northern Railroad.

The contract for stripping the Buffalo & Susquehanna Company's Susquehanna mine of 80 acres in the eastern outskirts of Hibbing, which was awarded the Winston-Dear Company, is one of the largest ever given on the Mesaba range. There are more than 6,000,000 cu. yd. of overburden to remove, and it is likely the work will require more than six years. Four to six steam shovels will be employed, 8 to 10 locomotives and a full complement of dump cars and other equipment. The overburden approximates 150 ft. None deeper has ever been stripped from a mining property.

Washington advices state that the Internal Revenue Bureau has received returns from about 300,000 of the corporations amendable to the law imposing a tax of 1 per cent. of their incomes above $5000. Additional returns are expected to swell the numbers to 325,000, which will agree with the estimate made before the law became operative. There are 400,000 corporations listed, but for some time many have been regarded as "dead" and existing in name only. It is now believed that the estimate of $25,000,000 revenue from the corporations this year may be exceeded slightly.

Germany is struggling with a deficit in the national revenue. An official statement made March 9 put the deficit at that time at $44,500,000.

American Steel & Wire Company Pensions in 1909.

A statement of the distribution made in 1909 by the pension department of the American Steel & Wire Company has recently been posted at the various plants of the company. This department was established January 1, 1902. The Board of Administration consists of William P. Palmer, J. S. Keefe, C. L. Miller, F. H. Daniels and Stephen W. Tener, the last named being the manager of the pension department, with office in the Western Reserve Building, Cleveland. The payment of pensions is entirely voluntary on the part of the company, which maintains the fund, with no tax of any kind upon the wages of the employees. All employees who have attained the age of 65 years and who have been in the service of the company or any of its predecessors for 10 years preceding are eligible to the pension list; also all employees 55 to 65 years of age who have served the preceding 10 years and who, in the opinion of the Board of Administration, have become physically disqualified for further service. The accompanying table gives the distribution made by the company in the past five years. The total number of pensioners December, 1909, which was 419, compares with 376 in December, 1908.

Distributions from the Pension Fund of the American Steel & Wire Company, 1905-1909.

	1905.	1906.	1907.	1908.	1909	Number of pensioners Dec., '09.
Pittsburgh district:						
South Side works	$103.20	$103.20	$34.40	.....	.....	..
Braddock works	60.00	182.70	198.40	$185.70	$211.70	5
Rankin works	416.58	447.00	628.60	755.65	951.00	8
Beaver Falls works	113.16	113.16	113.16	113.16	113.16	1
Donora wire works	347.40	347.40	347.40	347.40	347.40	1
Allentown works	280.72	770.77	782.35	995.04	1,064.54	13
Shoenberger works	1,960.54	2,337.11	2,370.56	2,382.46	2,732.51	21
	$3,281.60	$4,301.34	$4,474.87	$4,779.41	$5,420.31	49
Cleveland district:						
Office	$310.20	$310.20	$103.40	.....	.....	..
Consolidated works	401.80	604.65	946.05	$1,271.45	$1,594.60	13
American works	1,274.76	1,714.04	2,005.15	2,888.85	3,243.61	30
H. P. works	1,438.03	1,464.27	1,668.44	2,135.09	2,378.89	23
Newburgh wire works	1,860.05	2,629.27	3,515.22	4,817.49	6,774.09	48
Sharon works	.....	.....	60.00	309.30	223.80	2
Salem works	405.72	475.92	586.67	724.92	742.02	7
Newburgh steel works	3,403.93	3,974.55	4,210.84	4,771.62	6,251.33	35
Central furnaces	231.25	218.88	218.88	218.88	151.36	1
	$9,325.74	$11,391.78	$13,314.65	$17,137.60	$21,359.70	159
Chicago district:						
Waukegan works	$187.59	$387.49	$660.48	$681.48	$772.68	6
De Kalb works	797.56	1,319.56	1,332.36	1,820.76	2,474.71	21
Anderson works	259.35	337.50	436.15	748.40	944.65	8
Scott street works	215.40	353.28	470.88	505.88	530.88	5
Rockdale works	591.61	650.64	551.64	638.44	812.04	4
	$2,051.51	$3,048.17	$3,451.51	$4,394.96	$5,534.96	44
San Francisco district:						
Pacific works	$306.15	$294.72	$294.72	$294.72	$596.42	4
Worcester district:						
North works	$9,086.63	$10,846.95	$11,261.48	$11,881.28	$12,888.79	84
South works	6,425.15	8,028.87	8,345.25	10,140.56	10,807.08	77
Central works	.....	.....	.....	.....	104.80	2
	$15,511.78	$18,875.82	$19,606.73	$22,021.84	$23,800.67	163
Total for each year	$30,476.78	$37,911.83	$41,142.48	$48,628.53	$56,712.06	419

The British Iron Market.

The feeling throughout the British iron and steel trades is considerably improved, and in pig iron there has been an increase in the amount of business, resulting in slightly firmer prices. Buying seems to have been encouraged in part by the better conditions reported in the United States and Germany. Between February 4 and March 3 there was an advance from 51 shillings 4½ pence to 51 shillings 9 pence for No. 3 foundry iron, Middlesbrough, while warrant iron advanced from 51 shillings 3 pence to 51 shillings 8 pence. Consumers are reported more willing to contract ahead for pig iron, believing that prices are more likely to advance than to decline. Ore prices are well maintained on a basis about 4 shillings higher than at the corresponding time in 1909, Rubio ore at Middlesbrough being now quoted at 20 shillings 9 pence. The shipments of Cleveland iron in February were somewhat disappointing, yet the increase in stocks in Connal's stores was the smallest for any month since April, 1909, being 11,794 tons. The total stocks of Cleveland pig iron at the close of February in Connal's stores were 412,266 tons, against 175,000 one year preceding. The exports of Cleveland pig iron were but 67,799 tons in February, an amount smaller than in any month since 1905, except February, 1909. The shipments to the United States in February were 4535 tons.

In finished iron and steel improvement is reported, but without changes in prices. Reports have been in circulation that the Galvanized Sheet Makers' Association was about to dissolve its agreement, but this is denied. It is stated, however, that a number of firms in this branch of the trade have increased their capacity in the past year, and that overproduction is likely to result. It is a question if the best equipped mills which have been making improvements will consent to maintain prices for the sake of mills whose cost is higher. More encouraging reports come from the shipyards. The vessel situation is improved, and owners are more disposed to order new vessels than they have been for five years. The plate and structural mills are looking for more business from the vessel builders. The foundry trade and all metal working industries which buy from iron and steel works are operating on a larger scale. The Workington Iron & Steel Company has taken an order for 22,000 tons of rails for South Australia. Among rail inquiries are 12,000 tons for New South Wales and 9000 tons for India.

The Engineer's Society of Pennsylvania will hold its annual convention in Harrisburg, Pa., June 1, 2 and 3. Those who are in charge of the arrangements for the convention are hopeful that it will be attended by three or four times as many engineers as last year. A manufacturers' exhibit will be conducted in connection with the convention. A hall has been secured which will afford twice as much space as was available last year.

Canadian Trade Notes.

Rails for the National Transcontinental Road.

TORONTO, March 12, 1910.—Tenders are invited by the commissioners of the National Transcontinental Railway for 24,733 gross tons of 80-lb. steel rails (open hearth or Bessemer, at the option of the commissioners), and for the necessary rail fastenings. The tenders to be sent in and marked separately as follows: "Tender for Steel Rails," "Tender for Track Spikes," "Tender for Splice Bars," "Tender for Bolts and Nuts," "Tender for Nut Locks," and "Tender for Tie Plates." They are to be received at the office of the commissioners at Ottawa before noon, March 23. Tenders must be made on forms supplied by the commissioners, which forms, as well as the specifications, may be obtained from Gordon Grant, chief engineer, whose office is at Ottawa. An accepted check on a chartered bank of Canada for 5 per cent. of the amount mentioned on the tender must accompany each application.

The term during which the order is open to tender is short, the first appearance of the advertisement having been March 9. This will tend to keep the competition on this side of the Atlantic. It is to be added that, though the rails are for a road constructed by the Government of Canada, such of them as may be supplied from external sources will be subject to the import duties.

The removal of the surtax on imports from Germany has been followed by the arrival in Canada of a considerable number of traveling salesmen from Germany. These are but the advance movement, for, according to advices received by Canadian traders, very many more representatives of German houses are on the way. Among those heard from are selling agents of German steel manufacturers. It is not thought probable that Germany will be able to sell rails here, the $7 duty, plus the antidumping duty, being a heavy handicap on the importation of rails from so distant a source.

British Tenders for Canadian Contracts.

A contract for a quantity of iron pipe has been awarded by the City Council of Toronto to the Canada Foundry Company of this city. This was not in accordance with the recommendation of the city engineer, who reported in favor of the giving of the order to D. G. Stewart & Co., Glasgow, Scotland, that of the Canada Foundry Company being $270 higher. A protest was made by Mr. Grigg, the British Trade Commissioner in Canada, whose office is in Montreal. The Canada Foundry Company published a letter defending the action of the council. It is pointed out that that company, being a local concern, is really bound by the clauses of the contract relative to the wages and hours of employees, whereas firms outside of the country cannot be checked in this respect. Hence, the letter proceeds, either these clauses should be eliminated or a preference of 5 per cent. should be allowed to local industries by way of redress.

Other Trade Developments.

Three generators of 15,000 hp. each are being made at the works of the Canadian General Electric Company for the Electrical Development Company, whose power production plant at Niagara Falls is being doubled in capacity. The Canadian General Electric Company has also secured a contract for three generators of 12,500 hp. each for the Ontario Power Company, whose plant is likewise at Niagara Falls. In the same works are to be manufactured two generators of 10,000 hp. each for the Western Canada Power Company, Vancouver. These three contracts call for generators of a total of more than 100,000 hp. A large number of orders for smaller generators are also in hand, their total being said to be about equal to that of these three large orders. This business affords an idea of the progress of hydroelectric power development in Canada.

Two of the largest marine concerns on the Canadian side of the Great Lakes have formed a merger. The Playfair Company and the MacKay Company are the components. Since the merger was formed a contract to build a new steamer for it has been given to the Collingwood Shipbuilding Company. The price is about $350,000. The vessel is to have an iron ore cargo capacity of 10,000 tons.

Fifteen hundred shares of the stock of the Hamilton Steel & Iron Company are reported to have been sold privately March 5 at 150. There are reports that the proposed merger of that company, the Montreal Rolling Mills, the Canada Screw Company, the Canada Bolt & Nut Company and one or two other concerns was agreed upon a week ago. It was afterward denied that the Montreal Rolling Mills had agreed to the arrangement.

C. A. C. J.

Railroad Equipment Orders.

An exaggerated impression has doubtless been given by some of the publications concerning car orders recently placed or about to be placed by the railroads. W. H. Woodin of the American Car & Foundry Company is reported as saying: "The total new business now being offered by all the roads is not more than 12,000 cars, and running at capacity our company alone can turn out 10,000 finished cars a month, although we make about 8000 normally. The roads have been holding back their orders, and the fact that they need a lot of cars is of little assistance to the equipment companies unless the latter are called upon to supply that need."

From statements lately made, which seem authoritative, the number of cars now being offered by the railroads considerably exceeds 12,000. Of course, the real gauge of activity in railroad equipment is orders actually booked. Most of the discrepancy between the two views of the railroad equipment situation which has been made prominent in the past week is due to the indefiniteness of the plans of some railroads regarding additions to their equipment. In a number of cases the matter of buying new cars has been canvassed and the expected size of the order has been indicated, but time goes on and the orders are not placed. Some of them may be deferred for a number of months.

Among recent purchases are the following: Western Maryland, 500 steel hopper cars from the Cambria Steel Company and 400 gondola cars from the Standard Steel Car Company; Missouri Pacific, 100 gondolas from the American Car & Foundry Company; Mineral Range, 100 ore cars from the same company; Chesapeake & Ohio, 600 steel cars from the Pennsylvania Equipment Company; Western Fuel Company, 50 gondola cars from the same company; Denver, Northwestern & Pacific, 506 freight cars and 12 caboose cars. Among inquiries reported definitely in the market are the following: Grand Trunk, 2500 freight cars with steel underframes; Harriman Lines, 5450 freight cars, 55 caboose cars and 205 passenger equipment cars; Colorado & Southern, 1475 freight cars; Rock Island, 775 freight cars; Burlington, 1000 gondola cars; Southern Railway, 3600 freight cars; St. Paul, 1000 freight cars and 400 passenger cars, besides 100 locomotives. Among locomotive inquiries reported by the *Railway Age Gazette* are the following: Burlington, 25; Missouri, Kansas & Texas, 91 (of which according to an unconfirmed report 40 have been placed); Colorado & Southern, 22. The Virginian has ordered 20 locomotives and the Western Maryland 8 from the Baldwin Locomotive Works.

The Canadian Parliament has voted down a proposal to present two dreadnoughts to Great Britain by a majority of 55.

OBITUARY.

SIR ALFRED HICKMAN, a leading iron manufacturer and coal mine operator in England, died March 11, aged 79 years. He was chairman of Alfred Hickman Company, Ltd., and was one of the largest employers of labor in the United Kingdom. For many years he was the leading manufacturer of pig iron and steel in the Midlands. His company has coal mines, blast furnaces and steel works in Staffordshire and iron mines in Oxfordshire and elsewhere. He had always taken an important part in the settlement of questions arising between railroads and shippers. One of the first to appreciate the value of the basic process of steel making, he was also among the first to adopt the eight-hour shift at blast furnaces, and his relations with his employees were generally free from friction or disagreement. The deceased was a past president of the British Iron Trade Association, a member of the Council of the Iron and Steel Institute, also of the Associated Chambers of Commerce and of the Mining Association of Great Britain. He had served for a time in Parliament

JONATHAN R. SELTZER, senior member of the Seltzer-Klahr Hardware Company, Philadelphia, died suddenly March 1. He had been engaged in the hardware business over 60 years. He was born on a farm near Reading, Pa., and went to Philadelphia at the age of 15, entering the hardware store of Conrad & Roberts. His advancement was rapid. He was one of the organizers and for years had been prominently identified with the Enterprise Mfg. Company of Pennsylvania. Up to the death of Mr. Asbury, early in 1907, he had served as vice-president of the company and since that time as president. He was a member of the Hardware Merchants and Manufacturers Association and of the Union League, and a director in the Northern Trust Company. He leaves a widow and one daughter.

JOHN WAHL, St. Louis, died March 9, aged 78 years. He was president of the John Wahl Commission Company, one of the largest operators in lead and spelter in the United States. He was born in Hesse Darmstadt, Germany, and was taken to St. Louis by his parents in 1840. The firm of John Wahl & Co. was established in 1860 and incorporated in 1891 under its present style. Mr. Wahl had the distinction in 1867 of selling the first carload of pig lead shipped from the Joplin district. For 55 years he was identified with the German Savings Institution as director and vice-president, and for the last 12 years had been its president. He was an active member of the Merchants' Exchange, its vice-president in 1876 and president in 1879.

ALFRED HORTON KEITH, Pittsburgh, died February 28, aged 67 years. He retired from active business about two years ago, and had been in failing health for some time. He was connected with the Carbon Steel Company in Pittsburgh for nearly 20 years, and later was special agent in the Pittsburgh district for the Crucible Steel Company of America. He had a fine war record, having been brevetted Lieutenant Colonel for his gallantry. He was born in Vermont and leaves a widow, one son and four daughters.

THOMAS MCK. LAUGHLIN, assistant treasurer of the Jones & Laughlin Steel Company, Pittsburgh, died suddenly March 11, aged 35 years. He had been deeply affected by the recent death of his father and had been in ill health for some months. He leaves a widow and two sons. Besides being assistant treasurer of the Jones & Laughlin Steel Company, Mr. Laughlin was a director of that corporation, a director of the Keystone National Bank and a member of the Allegheny Country Club, the Pittsburgh Golf Club and the Pittsburgh Club. He was graduated from Yale in 1897.

SAMUEL JOSEPH, New York, president of the Continental Iron & Steel Company, president of the Royal Mfg. Company and treasurer of the Savoy Oil Company, died March 15, at Nice, France, after an operation for appendicitis, aged 55 years. He left New York in the middle of last February to join his wife and daughter at Nice, where they had been for the past year. He was born in Germany, but came to the United States when he was 17 years old, locating in Cincinnati.

ADOLPH G. GREENBERG, for many years connected with the American Steel & Wire Company as the Buffalo representative for the electrical and wire rope department of that company, died at his residence in Buffalo, March 13, from apoplexy, aged 47 years. He was an expert in all matters pertaining to the equipment of electrical railroads and power transmission.

JOHN L. ARTS, general manager of the Burden Iron Company, Troy, N. Y., died suddenly March 14. He entered the employ of the Burdens when a boy, and had been general manager for 30 years.

GEORGE C. GILL, general superintendent for R. Hoe & Co., New York, and for 56 years connected with that concern, died March 2, aged 71 years. He was born in New York. He leaves a widow, two sons and three daughters.

HENRY H. HUMMELL, general foreman of the plant of the Standard Steel Car Company at Butler, Pa., died March 11, at his home in Bellevue, Pa., aged 40 years.

PERSONAL.

Roy V. Wright, who for several years has been an editor of the *American Engineer and Railroad Journal*, has severed his connection with that publication, and on March 1 became a member of the editorial staff of the *Railway Age Gazette*, with direct supervision over the mechanical department.

Harry Hoover, an experienced foundry foreman, has accepted a position with the S. Obermayer Company, manufacturer of foundry facings, supplies and equipment, and will look after the interests of the company in Buffalo and Dunkirk, N. Y.

Charles R. Riley has been elected treasurer of the Horton Mfg. Company, Bristol, Conn., manufacturer of steel fishing rods, and will have charge of the sales and advertising in addition to his other duties. Jesse M. Judson has left the company to accept a position with the Boston Leather Binding Company, Boston, Mass.

Benjamin Talbot, Middlesbrough, England, inventor of the open hearth furnace and process bearing his name, is expected to arrive in the United States in the latter part of March.

Charles L. Bracket, formerly secretary of the Gibraltar Mfg. Company, Chicago, a subsidiary corporation of the McCord Mfg. Company, Detroit, has been made manager of the St. Louis office of the American Electric Fuse Company, Muskegon, Mich., with offices at 1326 Chemical Building.

J. G. White & Co., Inc., 43-49 Exchange place, New York, announce arrangements whereby C. A. Greenidge, graduate of Stevens' Institute, with a wide engineering experience, will be connected with the company as an engineer in its operating department.

A. C. Pieper of the metal firm of Bruce & Cook, 190 Water street, New York, is spending eight weeks on a pleasure trip in Europe.

H. A. Fennerty, purchasing agent of the Carnegie Steel Company, Pittsburgh, is recovering rapidly from a serious operation which he underwent recently at the Mercy Hospital in that city.

Humphrey Bond of the metal firm of Vivian Bond & Co., 68 Beaver street, New York, has returned from a business trip to Great Britain.

Dr. Charles Proteus Steinmetz of the General Electric Company, Schenectady, N. Y., will deliver an address on the "Industrial Use of Luminescence," illustrated with experimental demonstrations, before the

Clarkson Engineering Assembly, Thomas S. Clarkson Memorial School of Technology, Potsdam, N. Y., at the charter day exercises of the fourteenth anniversary, Friday evening, March 18.

Andrew Carnegie, who has been in California for some time, is expected to be in Pittsburgh in the first week in April, and the members of the Carnegie Veterans' Association are arranging to tender him a dinner on the evening of April 1, at the Duquesne Club. This is the first opportunity that the members of the association have had to give a dinner to Mr. Carnegie, who is host each year at a dinner to them at his home in New York City. It is expected that about 40 persons will attend the dinner, all of whom were formerly partners of Mr. Carnegie when he was actively engaged in business. A. C. Dinkey, president of the Carnegie Steel Company, is chairman of the committee on arrangements.

George Ahrens, president of the Moline Tool Company, Moline, Ill., has taken complete charge of the sales department. Wilson P. Hunt, who as secretary and general manager, has had charge of both office and shop ends of the business, will be relieved of a part of his duties, allowing him an opportunity to devote all of his time to shop work.

Horace Brock and his son, John Penn Brock, vice-president of the American Iron & Steel Mfg. Company, Lebanon, Pa., are spending some weeks inspecting steel plants in Germany.

The Sloss-Sheffield Steel & Iron Company.

The income account of the Sloss-Sheffield Steel & Iron Company for the fiscal year ending November 30, 1909, compares as follows with those for the two preceding years, omitting cents:

	1909.	1908.	1907.
Profit on pig iron	$896,816	$889,652	$1,400,392
Profit on coal	119,695	99,190	61,362
Profit on coke	162,013	132,829	135,127
Ore and dolomite sales	.....	388	8,739
Rent, royalties, &c	233,356	141,684	157,423
Interest and exchange	52,466	21,996	16,630
Total income	$1,454,347	$1,285,740	$1,779,673
Taxes and licenses	57,964	55,593	50,685
Balance	$1,396,383	$1,230,147	$1,728,988
General expenses	59,435	56,187	56,702
Net earnings	$1,336,947	$1,173,960	$1,672,286
Bond interest	210,000	210,000	210,000
Surplus	$1,126,947	$963,960	$1,462,286
Preferred dividends	469,000	469,000	469,000
Balance	$657,947	$494,960	$993,286
Common dividends	500,000	425,000	500,000
Surplus	$157,947	$69,960	$493,286
Previous surplus	3,121,574	3,146,386	2,723,322
Total surplus	$3,279,522	$3,216,346	$3,216,608

Gross sales and earnings in 1909 were $6,397,961, against $5,536,811 in 1908 and $6,654,303 in 1907. The working capital increased from $2,035,562 in 1908 to $2,070,575 in 1909.

The general balance sheet as of November 30 compares as follows:

Assets.	1909.	1908.
Property account	$21,746,010	$21,625,805
Treasury account	244,218	244,218
Stocks and bonds in other companies	399,157	392,557
Cash bills and accounts receivable	1,623,559	1,707,141
Supplies raw and finished material	341,009	251,731
Stocks in company's stores	75,676	79,082
Extension, renewal and replacement fund	121,222	190,665
Unexpired insurance and taxes	5,379	6,017
Totals	$24,556,230	$24,497,218
Liabilities.		
Preferred stock	$6,700,000	$6,700,000
Common stock	10,000,000	10,000,000
Bonds	4,000,000	4,000,000
Current accounts	480,784	504,260
Payrolls	95,924	76,612
Surplus	3,279,522	3,216,346
Totals	$24,556,230	$24,497,218

President J. C. Maben's statement to the stockholders, accompanying the annual financial report, alludes to the flow of water into the ore mines, and says that reports regarding the flooding of these mines have been very much exaggerated. The ore mines affected were on the No. 1 slope. All other ore mines are working satisfactorily, enabling the company to produce 800 tons of pig iron a day, sufficient to allow it to take care of all its contracts and to have some iron to sell. Other extracts from his statement follow:

The selling price of iron remained comparatively low for two-thirds of the fiscal year, so that the average delivery price for 1909 was below the average for the last 10 years, while the cost of production was increased a little over 1908 owing to the greater demand for labor. Profit per ton on iron, considering the fiscal year 1909 as a whole, was somewhat less than in 1908.

The plants have been well maintained. The output of pig iron during the year was the largest in the history of the company except 1904, when the make was 19,000 tons greater. The production of iron of all kinds in Alabama exceeded the output of 1907 by 76,943 tons, of which increase a little over 60,000 tons was contributed by Sloss-Sheffield.

The output of coal in 1909 was also the largest in any year since the organization of the company except one, while coke production was the largest in any one year, showing an increase of 66,000 tons over 1907, while the entire State at the same time shows a falling off in production of 224,600 tons. Iron ore production exceeded the best previous year's record by 129,000 tons. The Flat Top mine was the largest producer of coal in Alabama.

After full reserve for depreciation, renewal funds, &c., and full payments on the preferred and common stock, a surplus of $157,947 remained. The company has no floating debt, borrowed nothing during the year and offered more of its bills receivable for discount.

The Philadelphia General Strike.—The general strike of union labor in Philadelphia, Pa., now of 10 days' duration, called to aid the striking employees of the Philadelphia Rapid Transit Company, appears to be steadily weakening, so far as its effect on the iron and steel trades is concerned. While it never assumed the proportions of a general strike, a number of employees of industrial establishments walked out, somewhat inconveniencing for a time the operations of such plants. After a week of idleness, however, many of the men returned to their work, this being particularly noticeable on the part of the iron molders, who returned, some after a few days' idleness, under instructions from their national officers, others on Monday last, and a majority of the iron foundries are now operating close to normal conditions. In the textile and building trades, which embraced the largest percentage of the sympathetic strikers, some employees have returned to work; while in other less important directions the strike leaders have induced nonunion sympathizers to go out. The strike leaders have centered their efforts on a few of the larger industrial concerns, in some instances with partial success, in others with a total failure. No disorder or violence of any consequence has been reported the past week, and the general situation is growing steadily more quiet.

The Riverside Works of the National Tube Company at Benwood, W. Va., started up March 14 in all departments that it was possible to operate, after being shut down for some days on account of high water. Reports that the company had closed down this plant for an indefinite period are absolutely untrue.

The three mill tin plate plant of the Alcania Company at Avonmore, Pa., has closed down and may not resume operations again. This is a dipping plant, the company buying its black plate in the open market.

NEWS OF THE WORKS.

Iron and Steel.

The West Penn Steel Company, Brackenridge, Pa., has let contracts for the erection of an additional 80-ton open hearth furnace, together with necessary buildings to cover it. Work will start within the next 60 days and the furnace will probably be in operation about September 1. The company has just commenced to operate its fourth sheet mill and the other two are expected to be ready to operate about May 1. Its product is being extensively used in the automobile and metal furniture trades.

The Utah Iron Company, Salt Lake City, Utah, has filed articles of incorporation, the capital stock authorized being $3,000,000. It proposes to erect an iron and steel plant, owning about 600 acres of iron ore land. Thomas F. Kelly, Chicago, is president; Patrick Ryan, Salt Lake City, vice-president; Eugene M. Kelly, Chicago, treasurer; Edward McGurrin, Salt Lake City, secretary.

In connection with its low pressure steam turbine generating equipment, the Maryland Steel Company has just installed a Westinghouse-Leblanc No. 18 condenser at its Sparrows Point, Md., plant. Direct current at 250 volts is supplied by the low pressure turbine generating set, which is operated as an auxiliary to Westinghouse engine-driven equipment, effecting a considerable addition to the plant output without requiring additional steam generating apparatus.

The reconstructed blast furnace of the E. & G. Brooke Iron Company, Birdsboro, Pa., was blown in March 9.

The Colorado Fuel & Iron Company now has four furnaces in blast, Furnace D having been blown in February 25. The company had not had more than three furnaces in blast since November, 1907.

The No. 3 furnace of the Crane Iron Works of the Empire Steel & Iron Company, at Catasauqua, Pa., suffered from an explosion of gas March 14, but fortunately nobody was injured. The furnace was put out of commission for about 24 hours. The explosion was due to the use of a larger mixture than usual of physically fine foreign ore.

General Machinery.

The N. C. Davison Company, Keenan Building, Pittsburgh, has made the following recent sales: Gibson Printing Company, Pittsburgh, a 17-hp. automatic Jacobson gas engine; T. W. Simpson, Abilene, Texas, 17-hp. Jacobson gasoline engine; Elmer Goehring, New Brighton, Pa., a 7½-hp. gas engine.

The Laidlaw-Dunn-Gordon Company, Machesney Building, Pittsburgh, has received an order from the Jones & Laughlin Steel Company for four low pressure compressors and five high pressure compressors, with a capacity of 1000 ft. of air per minute each, to be installed at the plant of the Vesta Coal Company, Fredericktown, Pa.

The Massachusetts Fan Company, Watertown, Mass., is supplying 20 fans to the Gimbel store, New York City. These fans vary in size from 50 to 160 in., are motor driven, and are used in connection with tempering coils and reheaters.

The Cincinnati Iron & Steel Company, Cincinnati, Ohio, reports sales within the past two weeks of 10-ton 75-ft. span 3-motor electric crane to the Nashville Bridge Company, Nashville, Tenn.; a 6-ton 3-motor 31½-ft. span electric crane, Enterprise Foundry & Fence Company, Indianapolis, Ind.; 5-ft. full radial drill, Cincinnati Equipment Company, Cincinnati, Ohio; 10-ft. 10-gauge power brake, American Laundry & Machine Company, Norwood, Ohio; six 14-in. lathes, one alligator shear and number of smaller tools, Robert S. Armstrong & Bros., Atlanta, Ga.; 26 x 26 in. by 12 ft. planer with double head, Queen City Machine Tool Company, Cincinnati, Ohio.

The Union Foundry & Machine Company, Pittsburgh, has placed an order with the Fairbanks Company for a 30-in. by 8-ft. Flather planer, equipped with the latest type two-speed mechanism in the bed.

Foundries.

The Globe Malleable Iron & Steel Company, Syracuse, N. Y., on March 4 elected the following officers: President, W. C. Lipe; vice-president, A. T. Brown; secretary and treasurer, S. J. Marshall. These with F. H. Gates, Chittenango, N. Y., and E. H. Hungerford constitute the Board of Directors.

The Hanna Engineering Works, Chicago, Ill., has been successful lately in the sale of the Rathbone multiple molding machine, which it recently acquired. Among other orders one was received from the Lynchburg Foundry Company, Lynchburg, Va., and a second order each from the Vulcan Plow Company, Evansville, Ind., and the Green Engineering Company, Chicago, Ill. This machine is making a record of over 500 12 x 22 in. flasks, four castings in the flask, or 2000 castings in 9½ hours. The Hanna Works reports its shaker sales as keeping up to the average of about one a day, and the demand for its riveters is increasing steadily, sales amounting to more than 60 in the past four months.

Foundry additions will be made by the Powhatan Brass & Iron Works, Charlestown, W. Va. Glaize & Brothers, Winchester, Va., are the contractors in charge. Contract is also to be let at an early date for a crane, about 36 ft. span, to be operated by hand power.

The Tropenas Steel Company, New Castle, Del., is operating its steel casting plant on high grade steel castings, with one 2-ton and one 1000-lb. Tropenas converter. The plant has been further equipped with a complete outfit for the manufacture of such converters to be sold to parties interested in the manufactpre of small steel castings. The 1000-lb. converter is not intended to supersede the 2-ton vessel now used when the amount of castings averages 100 tons per month or more, but it is offered as a practical addition to a cast iron or brass foundry or for use by a construction firm which may desire to be independent of outside foundries.

George Cotter & Co., South Bend, Ind., manufacturers of electrical specialties, will add a foundry this spring. The melting capacity will be 10 tons daily.

In a week or two the plant at Verona, Pa., near Pittsburgh, formerly operated by the General Castings Company, but recently bought by the Standard Steel Car Company, will resume operations. It will furnish steel castings for the various works of the Standard Steel Car Company.

Power Plant Equipment.

The Sullivan Machinery Company, Chicago, Ill., is installing four of its tandem Corliss compound steam and two-stage air compressors for the Mason & Hanger Company at Cornwall, N. Y., where it has a contract for one of the siphons or tunnels for the New York Board of Water Supply. Each of the above units has a capacity of approximately 2500 cu. ft. of free air per minute, so that the completed plant will furnish 10,000 cu. ft. of free air per minute. These compressors operate on the same steam consumption as Corliss cross compound condensing engines of the same stroke, and, owing to their tandem construction, the cost of freight, engine room and foundations is about half of a cross compound installation of the same capacity.

The American Steel Foundries is making some changes in the electrical equipment of its shops at Thurlow, Pa., and is about to install a 200-kw. induction motor generator set. The alternating current side will receive 2200-volt, 60-cycle, two-phase current, while the output will be 250-volt direct current. A two-panel switchboard will carry the control instruments. This apparatus will be furnished by the Allis-Chalmers Company,

The Turners Falls Company, Turners Falls, Mass., which supplies a large amount of power in that section, has again found it necessary to increase its plant and has placed an order with the Allis-Chalmers Company for another 1000-kw. 2300-volt 60-cycle three-phase alternator to be directly connected to a water wheel. This makes the third unit which has been supplied by the same company.

The Central Boiler & Supply Company, Grand Rapids, Mich., will build an addition to its plant which will about double its capacity. W. G. Lee, formerly with the Adolph Leitelt Iron Works, has become associated with the company.

The Dake Engine Company, Grand Haven, Mich., has had plans prepared for a new foundry which it will build this spring. The building will be 75 x 100 ft. Castings up to 5 tons in weight will be made.

The Niagara Gasoline Motor Company has been incorporated at Buffalo, N. Y., with a capital stock of $50,000, and will manufacture the Niagara motors heretofore made by the Ducro Mfg. Company, having taken over that portion of the latter company's business. The new company has purchased a factory building, 50 x 150 ft., at Breckenridge and Herkimer streets, where it will establish its plant, and most of the machinery equipment required has been ordered. Morris M. Hedden, 28 Arnold place; John Dellinger, 125 Grant street, and John Hofreiter, 248 Herkimer street, are among the incorporators.

Bridges and Buildings.

The J. S. Hunter Company, Fulton Building, Pittsburgh, has been awarded a contract for the structural work for the Cotton Exchange Building, to be erected in Memphis, Tenn. The building will be a steel frame structure, 75 x 150 ft., 19 stories, and will require 2600 tons of steel. The contract for the steel has been placed with the Virginia Bridge & Iron Company, Roanoke, Va. Erection has been commenced and the work is expected to be completed abouf June 1.

Fires.

The main building of the American Bridge Company's plant at Toledo, Ohio, was damaged by fire February 28. Loss about $15,000.

Fire destroyed the shop of the Brown-Talbot Machinery Company, Boston, Mass. Loss, $10,000.

On March 14 fire destroyed the wheel and rod shop, boiler plant and engine hoist at the Seaboard Air Line shops, Norfolk, Va., entailing an estimated loss of $35,000.

On March 9 fire destroyed the storage battery department of the Westinghouse Machine Company at East Pittsburgh, Pa.; estimated loss, $75,000.

On March 10 the metal door plant of the Variety Mfg. Company, Chicago, Ill., was totally destroyed by fire.

A $70,000 fire at Charlotte, N. C., March 7, destroyed the

plants of the Henderson Mfg. Company and the Corbitt Bucket Company.

Hardware.

Charles T. Main, mill engineer and architect, Boston, Mass., has completed plans for three new buildings for the Yale & Towne Mfg. Company, Stamford, Conn., on which bids are being considered this week. The plans cover: Building No. 6—57 x 57 ft., six floors, three floors reinforced concrete, three floors slow burning mill construction, sawtooth roof; building No. 12—50 x 153 ft., six floors, slow burning mill construction, all beams of wood, sawtooth roof; building No. 12½—50 x 60 ft., six floors, reinforced concrete throughout except roof, of slow burning mill construction. All these buildings have walls of brick, first floor on ground level and every floor waterproofed, with tar and gravel roofs.

Miscellaneous.

There is a probability that the Best Mfg. Company, Pittsburgh, may take over and operate the shops partly built at Oakmont, Pa., near Pittsburgh, by the Crane Company of Chicago. The matter has not yet been definitely arranged.

The Bigsby Mfg. Company, Cleveland, Ohio, has purchased the eaves trough business of the Thomas Steel Company, Niles, Ohio. An item in *The Iron Age* of March 3 indicated that the entire plant of the Thomas Steel Company had been taken over, which was not correct.

The American Seeding Machine Company, Richmond, Ind., which is one of the largest manufacturers of agricultural implements, is about to begin the use of electricity in its local plant. Already some of its other establishments have been so equipped by the Allis-Chalmers Company, which has a contract for the new apparatus. This will include one 312½ K. V. A., 200 rev. per min., and one 187½ K. V. A. 225 rev. per min. three-phase 60-cycle 240-volt engine driven alternator and two 15 kw. 120-volt exciters.

The Hayes Mfg. Company, Pontiac, Mich., manufacturer of automobile parts, is having plans prepared for a three-story factory, 50 x 200 ft., of reinforced concrete, which it will erect at once.

The Fisher Body Company, Detroit, Mich., will make extensive additions to its factory on St. Antoine street.

The Niagara Metalware Mfg. Company has been incorporated at Buffalo, N. Y., with a capital stock of $40,000, to manufacture metalware specialties, and will take over and merge the business of the O. K. Mfg. Company. H. R. Schmiedendorf, 45 North Division street, is president and manager.

The Auto Battery & Electrical Company, Buffalo, N. Y., has been incorporated with a capital stock of $20,000 and will manufacture storage batteries and other electrical appliances and devices for automobiles. The company will establish its factory at 119 West Tupper street and present requirements in the way of machinery equipment have been ordered. Theodore P. Meinhard, 22 West Utica street, Buffalo, is president, and Charles Chamberlain, formerly with the Hoosier Battery Company, Evansville, Ind., is manager.

The Pittsburgh Emery Wheel Company, Pittsburgh, is operating its plant at Rochester, Pa., night and day, having a large number of orders on its books. It contemplates making some large additions to its plant in the near future, but definite plans have not been completed.

The Almond Drill Chuck Suit.—The T. R. Almond Mfg. Company, Ashburnham, Mass., advises us that the United States Circuit Court of Appeals, second circuit, has affirmed with costs the decree of the Circuit Court of the eastern district of New York, dismissing the bill in an equity suit brought to enjoin the alleged infringement of United States patent No. 709,014, issued September 16, 1902, to Arthur I. Jacobs, for a drill chuck. The first action in the alleged infringement of patent was a suit in equity entered in March, 1906. At that time the Jacobs Mfg. Company gave notice to the trade that suit had begun, and that all dealers handling the Almond chuck would be liable to an accounting. The decision just rendered by the United States Circuit Court of Appeals ends the litigation between the Jacobs Mfg. Company and the T. R. Almond Mfg. Company.

A unique plan for inducing the location of manufacturing enterprises is being tried out by the Board of Trade of Easton, Pa. A fund of $600,000 has been raised to be loaned to companies for building purposes, providing that they establish plants in Easton. The stipulation is that the company shall purchase a lot, which is to be sold at a nominal price, and sufficient capital for putting up the buildings will be loaned to the company by the Board of Trade, which charges interest of 5.4 per cent. The idea is attracting attention and several companies are investigating the advantages of Easton with a view to locating there.

The Lackawanna Steel Company's Operations in 1909.

The financial statement of the Lackawanna Steel Company for the year ending December 31, 1909, was presented in our issue of February 24, page 485. At the annual meeting of the company, held at the city of Lackawanna, Erie County, N. Y., March 9, President E. A. S. Clarke presented his report, from which we take the following:

In the report sent you a year ago you were advised that on February 19, 1909, radical reductions had been made in the prices of your company's products, and the hope was expressed that these lower prices might stimulate business. It was not, however, until the end of the first half of 1909 that business showed any substantial increase in volume, and then only at prices materially below the reduced prices of February 19. The first five months' operation of 1909, therefore, showed a deficit; but beginning in June earnings increased rapidly, so that the close of the year showed the deficit wiped out and a surplus earned, over all charges and deductions, including liberal allowances for depreciation, of $778,108.91, equal to about 2.25 per cent. on the outstanding capital stock, a gain of $2,104,381.98 over 1908. Comparison of the average price of $27.67 per gross ton received by the company for its products in 1909, with the corresponding figures $31.63 in 1908 and $33.28 in 1907, indicates why, in view of the tonnage shipped, the surplus is not greater. Prices for 1910 to date are higher than those of 1909, and the outlook for business during the year is favorable.

Your properties have been maintained during the past year in high physical condition.

The company received during 1909 from mines which it owns, or is interested in, and from other sources, 1,721,214 gross tons of iron ore, and produced a total of 700,553 gross tons of coke and 843,709 gross tons of pig iron. It also produced 600,826 gross tons of Bessemer ingots and 412,136 gross tons of open hearth ingots, a total of 1,012,962 gross tons of steel ingots of all kinds. Shipments of products were as follows, all in gross tons, the figures for the years 1907 and 1908 being given for comparison:

	1909.	1908.	1907.
Standard rails	278,885	190,763	523,200
Light rails	33,787	20,253	48,777
Angle bars, fittings, &c	43,901	16,719	33,510
Structural shapes	138,021	72,816	141,455
Plates	60,953	33,832	113,969
Merchant steel products	41,607	17,921	61,343
Sheet bars, slabs, billets and blooms	201,455	104,108	61,157
Pig iron and miscellaneous	115,044	20,438	8,289
Totals	913,653	476,850	991,700

As the $10,000,000 five-year gold notes and the $5,000,000 one-year secured gold notes of your company matured March 1, 1910, your board devised a plan for funding this indebtedness and providing additional capital, which you ratified and authorized at a special meeting held on February 15, 1910. Under this plan $10,000,000 first consolidated mortgage (convertible) gold bonds, series "A," 5 per cent., and $10,000,000 five-year 5 per cent. convertible gold debentures have been issued and sold, and $10,000,000 first consolidated mortgage gold bonds are reserved for issue after March 1, 1911, in the discretion of your board and under suitable restrictions, to provide for the cost of additions to and betterments of your property. The consummation of the above plan has greatly strengthened your company's financial position. It is the intention of your board to apply for the listing on the New York Stock Exchange of the above new securities and of the common stock of your company.

THE IRON AND METAL TRADES

Finished Products More Active.

A Further Decline in Pig Iron Prices.

Betterment in the volume of business in finished materials has come in the past week, accompanied by a continuance of sporadic buying of pig iron at lower prices. While there has been one official expression from the car industry to the effect that the extent of new business has been exaggerated, definite inquiries from the railroads are now pending in numbers sufficient to give distinct encouragement to plate and structural mills. In January and February the various steel companies shipped considerably more than they booked. In some lines March has brought new business at a rate close up to the rate of shipment. In seasonable products, particularly wire, the movement has been noticeably better.

The bulk of pig iron buying is still by large interests, which are willing to supply a part of their needs for the third quarter and second half at the low prices they can command in the present interval of uncertainty. There are evidences that more pig iron has been bought for later months of the year than is commonly understood. The weight of current production of merchant iron upon the market is more apparent as general buying is delayed.

In Southern iron the weakness is more marked on early deliveries, while on forward contracts Northern sellers seem equally willing to make concessions. For Southern iron $13 for No. 2, second quarter delivery, has become more general, and there has been sharp competition for Eastern business in Southern grades. Not only the Westinghouse contract, but other transactions of the past week have shown that Northern producers are disposed to sell some portion of their product of the second half at prices only considered applicable until recently to prompt shipments.

The demand for steel making iron has evidently been satisfied for the present.

The stringent condition of the billet market is an index of the pressure upon the converting and melting capacity of the large steel companies to supply the demands of their finishing mills. Billets and sheet bars are very firm in all markets.

The largest rail contract was for 42,000 tons for the Southern Railway, taken by the leading interest. About 20,000 tons for this road remains to be placed. British mills have done fairly well in international business. It is reported that a part of the 20,000 tons for Manchuria, pending for some time, will go to the Chinese mill at Hankow.

Structural business continues active at the rate of 100,000 tons a month in the larger sized contracts, but there is persistent price cutting by fabricating mills, which has had its effect upon the market for plain material. The large fabricating capacity of the country is telling, notwithstanding the great amount of building. In New York the possibility of a building trades strike is looming up.

The American Bridge Company is fabricating 6000 tons of steel for its new plant at Gary. For the new union depot at Kansas City 18,000 tons will be required, and at New York the award of the steel for the Merchants' Exchange Building at the Grand Central Terminal is expected soon.

For the Bull Run water system at Portland, Ore., the contract let last week calls for 10,000 tons of riveted pipe, the plates for which will be rolled at Pittsburgh. The cast iron pipe foundries are busy, with prospects of an increasing spring demand.

Jobbers have been carrying heavy stocks of merchant pipe, which have not moved as expected, but conditions this month are much more favorable.

Western bar mills are far behind in shipments, and on certain sizes they will be kept busy far beyond July 1. The demand from agricultural works is without any parallel. The starting of the second merchant mill at Gary next week will give some relief.

The prospect is small of carrying out the plan for a selling agency for Connellsville coke. Meanwhile the output of Connellsville ovens has been increasing.

A Comparison of Prices.

Advances Over the Previous Month in Heavy Type, Declines in Italics.

At date, one week, one month and one year previous.

	Mar. 16, 1910.	Mar. 9, 1910.	Feb. 16, 1910.	Mar. 17, 1909.
PIG IRON, Per Gross Ton:				
Foundry No. 2, standard, Philadelphia	*$18.00*	$18.00	$18.75	$16.25
Foundry No. 2, Southern, Cincinnati	*16.25*	16.50	17.00	14.75
Foundry No. 2, local, Chicago	*18.25*	18.50	19.00	16.50
Basic, delivered, eastern Pa.	18.50	18.50	18.50	15.50
Basic, Valley furnace	*16.00*	16.00	16.25	15.00
Bessemer, Pittsburgh	*18.65*	18.65	18.90	16.40
Gray forge, Pittsburgh	*16.15*	16.15	16.90	14.40
Lake Superior charcoal, Chicago	19.50	19.50	19.50	19.50
BILLETS, &c., Per Gross Ton:				
Bessemer billets, Pittsburgh	27.50	27.50	27.50	23.00
Forging billets, Pittsburgh	32.00	32.00	32.00	25.00
Open hearth billets, Philadelphia	30.60	30.60	30.60	25.40
Wire rods, Pittsburgh	33.00	33.00	33.00	33.00
Steel rails, heavy, at mill	28.00	28.00	28.00	28.00
OLD MATERIAL, Per Gross Ton:				
Steel rails, melting, Chicago	16.50	16.50	16.50	13.00
Steel rails, melting, Philadelphia	16.50	16.50	16.50	13.50
Iron rails, Chicago	19.00	19.00	19.00	17.25
Iron rails, Philadelphia	**20.50**	20.00	20.00	17.00
Car wheels, Chicago	*17.00*	17.00	17.50	14.75
Car wheels, Philadelphia	16.75	16.75	16.75	14.00
Heavy steel scrap, Pittsburgh	*17.00*	16.50	17.25	14.40
Heavy steel scrap, Chicago	*15.00*	15.00	15.25	12.00
Heavy steel scrap, Philadelphia	16.50	16.50	16.50	13.50
FINISHED IRON AND STEEL, Per Pound:	Cents.	Cents.	Cents.	Cents.
Refined iron bars, Philadelphia	*1.57½*	1.57½	1.60	1.37
Common iron bars, Chicago	*1.55*	1.55	1.60	1.40
Common iron bars, Pittsburgh	*1.65*	1.65	1.70	1.40
Steel bars, tidewater, New York	*1.61*	1.61	1.66	1.36
Steel bars, Pittsburgh	*1.45*	1.45	1.50	1.20
Tank plates, tidewater, New York	1.71	1.71	1.71	1.46
Tank plates, Pittsburgh	1.55	1.55	1.55	1.30
Beams, tidewater, New York	1.66	1.66	1.66	1.46
Beams, Pittsburgh	1.50	1.50	1.50	1.30
Angles, tidewater, New York	1.66	1.66	1.66	1.46
Angles, Pittsburgh	1.50	1.50	1.50	1.30
Skelp, grooved steel, Pittsburgh	1.50	1.50	1.50	1.25
Skelp, sheared steel, Pittsburgh	1.60	1.60	1.60	1.35
SHEETS, NAILS AND WIRE, Per Pound:	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, Pittsburgh	2.40	2.40	2.40	2.20
Wire nails, Pittsburgh*	1.85	1.85	1.85	1.95
Cut nails, Pittsburgh	**1.85**	1.85	1.80	1.80
Barb wire, galv., Pittsburgh*	2.15	2.15	2.15	2.45
METALS, Per Pound:	Cents.	Cents.	Cents.	Cents.
Lake copper, New York	13.75	13.75	13.75	12.75
Electrolytic copper, New York	13.50	13.50	13.50	12.25
Spelter, New York	**5.73**	5.73	5.60	4.80
Spelter, St. Louis	**5.58**	5.58	5.45	4.65
Lead, New York	*4.50*	4.55	4.55	4.02½
Lead, St. Louis	*4.35*	4.40	4.40	3.87½
Tin, New York	*31.70*	32.45	33.20	28.50
Antimony, Hallett, New York	8.25	8.25	8.25	7.75
Nickel, New York	45.00	45.00	45.00	45.00
Tin plate, 100 lb., New York	$3.84	$3.84	$3.84	$3.64

* These prices are for largest lots to jobbers.

Prices of Finished Iron and Steel f.o.b. Pittsburgh.

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Paul, 32c.; St. Louis, 22½c.; New Orleans, 30c.; Birmingham, Ala., 45c. Rates to the Pacific Coast are 80c. on plates, structural shapes and sheets, No. 11 and heavier; 85c. on sheets, Nos. 12 to 16; 95c. on sheets No. 16 and lighter; 65c. on wrought pipe and boiler tubes.

Structural Shapes.—I-beams and channels, 3 to 15 in., inclusive, 1.50c. to 1.55c., net; I-beams over 15 in., 1.65c., net; H-beams over 8 in., 1.75c.; angles, 3 to 6 in., inclusive, ¼ in. and up, 1.60c., net; angles over 6 in., 1.65c., net; angles, 3 x 3 in. and up, less than ¼ in., 1.75c., base, half extras, steel bar card; tees, 3 in. and up, 1.65c., net; zees, 3 in. and up, 1.60c., net; angles, channels and tees, under 3 in., 1.50c., base, plus 10c., half extras, steel bar card; deck beams and bulb angles, 1.80c., net; hand rail tees, 2.80c., net; checkered and corrguated plates, 2.80c., net.

Plates.—Tank plates, ¾ in. thick, 6¼ in. up to 100 in. wide, 1.55c. to 1.60c., base. Following are stipulations prescribed by manufacturers, with extras to be added to base price (per pound) of plates:

Rectangular plates, tank steel or conforming to manufacturers' standard specifications for structural steel dated February 6, 1903, or equivalent, ¼-in. thick and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per square foot are considered ¼-in. plates. Plates over 72 in. wide must be ordered ¼-in. thick on edge, or not less than 11 lb. per square foot, to take base price. Plates over 72 in. wide ordered less than 11 lb. per square foot down to the weight of 3-16-in. take the price of 3-16-in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

Gauges under ¼-in. to and including 3-16-in. on thinnest edge	$0.10
Gauges under 3-16-in. to and including No. 8	.15
Gauges under No. 8 to and including No. 9	.25
Gauges under No. 9 to and including No. 10	.30
Gauges under No. 10 to and including No. 12	.40
Sketches (including all straight taper plates), 3 ft. and over in length	.10
Complete circles, 3 ft. diameter and over	.20
Boiler and flange steel	.10
"A. B. M. A." and ordinary firebox steel	.20
Still bottom steel	.30
Marine steel	.40
Locomotive firebox steel	.50
Widths over 100 in. up to 110 in., inclusive	.05
Widths over 110 in. up to 115 in., inclusive	.10
Widths over 115 in. up to 120 in., inclusive	.15
Widths over 120 in. up to 125 in., inclusive	.25
Widths over 125 in. up to 130 in., inclusive	.50
Widths over 130 in	1.00
Cutting to lengths or diameters under 3 ft. to 2 ft., inclusive	.25
Cutting to lengths or diameters under 2 ft. to 1 ft., inclusive	.50
Cutting to lengths or diameters under 1 ft	1.55

No charge for cutting rectangular plates to lengths 3 ft. and over.

TERMS.—Net cash 30 days.

Sheets.—Minimum prices for mill shipments on sheets in carload and larger lots, on which jobbers charge the usual advances for small lots from store, are as follows: Black annealed sheets, Nos. 3 to 8, 1.70c.; Nos. 9 and 10, 1.75c.; Nos. 11 and 12, 1.80c.; Nos. 13 and 14, 1.85c.; Nos. 15 and 16, 1.95c. Box annealed sheets, Nos. 17 to 21, 2.20c.; No. 22 to 24, 2.25c.; Nos. 25 and 26, 2.30c.; No. 27, 2.35c.; No. 28, 2.40c.; No. 29, 2.45c.; No. 30, 2.55c. Galvanized sheets, Nos. 13 and 14, 2.50c.; Nos. 15 and 16, 2.60c.; Nos. 17 to 21, 2.75c.; Nos. 22 to 24, 2.90c.; Nos. 25 and 26, 3.10c.; No. 27, 3.30c.; No. 28, 3.50c.; No. 29, 3.60c.; No. 30, 3.85c. Painted roofing sheets, No. 28, $1.70 per square. Galvanized roofing sheets, No. 28, $3 per square, for 2½-in. corrugations.

Wrought Pipe.—The following are the discounts on the Pittsburgh basing card on carloads of wrought pipe which went into effect January 1:

	Steel		Iron	
	Black.	Galv.	Black.	Galv.
⅛ and ¼ in.	70	54	65	..
⅜ in.	71	57	66	52
½ in.	74	62	69	57
¾ to 6 in.	78	68	73	63
7 to 12 in.	72	57	67	52
Plugged and Reamed.				
1 to 4 in.	76	66	71	61
Extra Strong, Plain Ends.				
⅛ to ⅜ in.	63	51	58	46
¼ to 4 in.	70	58	65	53
4½ to 8 in.	66	54	61	49
9, 10, 11 and 12 in.	54	42	..	..
Double Extra Strong, Plain Ends.				
½ to 8 in.	59	48	54	43

The above steel pipe discounts are for "card weight," subject to the usual variation of 5 per cent.

Boiler Tubes.—Discounts on lap welded steel and charcoal iron boiler tubes to jobbers in carloads are as follows:

	Steel.	Iron.
1 to 1½ in.	49	43
1¾ to 2¼ in.	61	43
2½ in.	63	48
2¾ to 5 in.	69	55
6 to 13 in.	61	43

2½ in. and smaller, over 18 ft., 10 per cent. net extra.
2¾ in. and larger, over 22 ft., 10 per cent. net extra.

Less than carloads to destinations east of the Mississippi River will be sold at delivered discount for carloads lowered by two points, for lengths 22 ft. and under; longer lengths, f.o.b. Pittsburgh.

Wire Rods.—Bessemer, open hearth and chain rods, $33.

Steel Rivets.—Structural rivets, ¾-in. and larger, 2.15c., base; cone head boiler rivets, ¾-in. and larger, 2.25c., base; ⅝-in. and 11-16-in. take an advance of 15c., and ½-in. and 9-16-in. take an advance of 50c.; in lengths shorter than 1 in. also take an advance of 50c. Terms are 30 days, net cash, f.o.b. mill. The above prices are absolutely minimum on contracts for large lots, makers charging the usual advances of $2 to $3 a ton to the small trade.

Pittsburgh.

PARK BUILDING, March 16, 1910.—(*By Telegraph.*)

Pig Iron.—Following the large purchase by the Westinghouse Electric & Mfg. Company, details of which are given in our report by mail, the market has been rather quiet, but there is a fair amount of inquiry. Consumers of iron are proceeding cautiously, evidently not being satisfied that present prices will hold. No large inquiries are in the market for Bessemer and basic, but prices on basic are firmer than for some time. We quote standard Bessemer iron at $17.75; malleable Bessemer, $16.25 to $16.50; basic, $16; No. 2 foundry, $16 to $16.25, and gray forge, $15.25, all at Valley furnace, the freight rate to Pittsburgh being 90 cents a ton.

Steel.—The steel situation continues strong, relatively high prices being paid for small lots of Bessemer and open hearth billets and sheet and tin bars. A tin plate interest has bought upward of 1000 tons of Bessemer bars for forward delivery at $29, Pittsburgh, or $29.50, delivered. We also note a sale of about 200 tons of open hearth sheet bars on the basis of $29.85, Pittsburgh. We quote Bessemer 4 x 4 in. billets at $27.50 to $28; Bessemer sheet and tin bars, $29 to $29.50; 4 x 4 in. open hearth billets, $29 to $29.50; open hearth small billets, $30.50 to $31; open hearth sheet and tin bars, $29.50 to $30, and forging billets, $32 to $33, Pittsburgh.

Tin Plate.—The American Sheet & Tin Plate Company, having started four more hot tin mills in its Shenango works, is now operating 67 out of a total of 70 mills in the New Castle district, and a grand total of 89 out of 235 serviceable hot mills.

(*By Mail.*)

As indicated in this report last week, some low prices were made on the inquiry of the Westinghouse Electric & Mfg. Company for 15,000 tons of foundry pig iron, for delivery in the last half of the year. The 5000 tons for the Allegheny, Pa., works went at $16.50, delivered, and was divided between the Clinton Iron & Steel Company, which has a freight rate of 35c., and the Dunbar Furnace Company, which has a freight rate of 85c., the iron netting the latter concern $15.65 at furnace. The 10,000 tons for the Cleveland, Ohio, works was divided between the Cleveland Furnace Company, operated by Rogers, Brown & Co. and the Upson Nut Company, these two concerns having a switching charge of 25c., the iron netting $16.50 at furnace to each. The above prices are on the Westinghouse Company's class 2 iron, class 1 going at 25c. less and class 3 at 25c. higher. The low prices made were not a surprise to the trade; in fact, it was generally expected that this large inquiry, the only one of any moment for foundry iron that has come out this year, would bring low quotations. Instead of having a depressing effect on the market, the opposite has been the result, as it is stated that foundry iron is now firmer than for some time, and it is doubtful whether the purchase could be duplicated. There is practically no new inquiry for Bessemer, basic or gray forge. The speculative lots of basic iron that have been hanging over the market for some time have been pretty well cleaned up, and that made of iron is firm to-day at $16 minimum, Valley furnace, some sellers asking $16.25 and higher. Standard Bessemer iron remains at $17.75, at Valley furnace, but it is possible that some outside Bessemer iron held by dealers might be picked up in small lots at a slightly lower figure. The steel situation is very tight, and high prices are being paid on small lots of Bessemer and open hearth billets and sheet and tin bars for prompt shipment. Specifications for finished iron and steel are coming in at a fairly satisfactory rate, and a continuance of favorable weather is expected to bring an increase in the volume of new business and in specifications against contracts. Some very large work is being figured on that will require a heavy tonnage of plates and structural material. There is a better movement in scrap, heavy steel scrap having shown an advance of about

50c. a ton from the low figure ruling some time ago; one consumer outside the Pittsburgh district has been a heavy and consistent buyer of this material for some time. The coke market does not show much betterment; little progress is being made in the move to establish a central selling agency for the sale of furnace and foundry coke, and the project may be given up. Shippers are having trouble in getting cars fast enough to meet their needs.

Ferromanganese.—No sales of moment have been made in this market for some time. We quote 80 per cent. foreign ferro at $43, seaboard, the freight rate to Pittsburgh being $2.30 a ton.

Ferrosilicon.—Consumers have pretty well covered their requirements ahead, some of them for the remainder of this year, and new inquiry is light. Prices are firm but without change. We continue to quote 10 per cent. at $23.90; 11 per cent., $24.90; 12 per cent., $25.90, and 50 per cent., $62 to $62,50, Pittsburgh, for prompt shipment. Sales of two carloads, or about 60 tons, for March and April delivery, are reported at $62, Pittsburgh.

Muck Bar.—Puddlers have been granted an increase of 12½c. a ton for March and April, and this will probably have the effect of making prices on muck bar slightly firmer. We quote best grades of muck bar made from all pig iron at $29.50 to $30, Pittsburgh.

Rods.—Consumers of rods continue to specify quite freely against contracts, but there is little new inquiry. We continue to quote Bessemer open hearth and chain rods at $33, Pittsburgh.

Skelp.—New inquiries are more active and the mills are entering a fair amount of orders. We note quite an active demand for grooved and sheared iron plates and prices are firm. For ordinary widths and gauges we continue to quote grooved steel skelp at 1.50c. to 1.55c.; sheared steel skelp, 1.60c. to 1.65c.; grooved iron skelp, 1.80c., and sheared iron skelp, 1.90c., all f.o.b. mill, Pittsburgh.

Rails.—There is a fair run of new orders for standard sections, which, while small in themselves,, make up a fairly large tonnage. One order called for 1350 tons. The Carnegie Steel Company entered new orders last week for about 1600 tons of light rails, and has enough actual orders booked for light rails and standard sections to keep the three Edgar Thomson rail mills running at their present gait for two or three months. We quote steel axles at 1.75c. to 1.80c. and splice bars, 1.50c., at mill, Pittsburgh. Light rail prices are as follows: 8 to 10 lb., $32; 12 to 14 lb., $29; 16, 20 and 25 lb., $28; 30 and 35 lb., $27.75, and 40 and 45 lb., $27, Pittsburgh. These prices are for 250-ton lots and over, and for small lots premiums of 50c. per ton and more are being paid. We quote standard sections at $28, at mill.

Plates.—The general contract for the building of the extension to the water works at Portland, Ore., has been placed with the Shaw-Batcher Company, Sacramento, Cal. The contract for the 10,000 tons of plates needed for this work has not yet been placed, but is expected to come to a local mill. All the plates for steel floats ordered by two railroad companies from the New York Shipbuilding Company, 3000 to 4000 tons, will be furnished by the Carnegie Steel Company. As yet none of the important inquiries for steel cars noted in this report last week has been placed, but they are expected to come out at any time. Local plate mills are figuring with the steel car companies for upward of 150,000 tons of plates and small shapes needed for these cars. Specifications against plate contracts are coming in freely, and local plate mills are well filled up for the next three or four months. We quote ¼-in. and heavier plates at 1.55c. in large lots and 1.60c. in small lots, f.o.b. at mill.

Structural Material.—No local contracts of moment have been placed the past week, but it is expected that bids will be asked in a short time for about 8000 tons of steel for the new Point bridge referred to in this report last week. The American Bridge Company will fabricate in the next several months about 6000 tons of steel for its new plant at Gary, Ind. Two units will be built first, and each will require about 3000 tons of steel. It is stated that the capacity of each unit will be about 5000 tons per month, and that the first two units will be in commission early next year. When these are finished two more units will be built. The same company has taken about 2000 tons for an Eastern hotel and about 1800 tons for an office building in Portland, Ore. We continue to quote beams and channels up to 15-in. at 1.50c., minimum, in large lots, and 1.55c. to 1.60c. on small lots for prompt shipment.

Tin Plate.—There is a surprisingly large new demand for tin plate for this season, and consumers who have not covered their entire requirements up to July are having trouble in finding mills that can take on any more tin plate orders for delivery in second quarter. The American Sheet & Tin Plate Company has put on several more hot mills at its two plants in New Castle, Pa., and expects to turn out more tin plate this month than it has in a long time. We continue to quote 100-lb. cokes at $3.60 per base box, f.o.b. Pittsburgh, for delivery through second quarter. In some cases premiums of 5c. to 10c. a box have been paid on good sized orders where the mills would guarantee shipment within a specified time.

Sheets.—We note a more active demand for sheets for roofing and siding, a good deal of this business that was held up by the severe weather now coming out. Reports of shading in prices of sheets have been exaggerated, the cutting being confined to not more than two or three mills that are in need of orders for prompt shipment, and does not amount of more than $2 a ton, this concession being made occasionally on black and galvanized sheets, but only for prompt shipment. Blue annealed sheets continue to demand premiums of $2 to $3 a ton for prompt shipment. Regular prices are as follows: Blue annealed sheets, Nos. 3 to 8, 1.70c.; Nos. 9 and 10, 1.75c.; Nos. 11 and 12, 1.80c.; Nos. 13 and 14, 1.85c., and Nos. 14 and 15, 1.95c.; one-pass box annealed No. 28 black sheets, 2.40c., and No. 28 galvanized, 3.50c., at mill. We quote corrugated roofing sheets at $1.70 per square for painted and $3 for galvanized, 2½-in. corrugations. Jobbers charge the usual advances over these prices for small lots from store.

Bars.—Some good sized inquiries for both iron and steel bars are in the market, and the mills are figuring on more new business at present than for some little time. Steel bars for concrete work are in good demand and contractors are placing new orders and specifying liberally on their contracts. The railroads are specifying freely against their contracts for steel bars placed some time ago, and shipments by the mills at present are quite heavy. We quote steel bars at 1.45c. on attractive orders for delivery ahead, and 1.50c. to 1.55c. on general current orders for shipment within the next three or four weeks. We quote iron bars at 1.65c. to 1.70c., Pittsburgh, with freight to destination added.

Hoops and Bands.—Specifications against contracts continue to come in at a fairly satisfactory rate, but there is only a moderate amount of new buying. The continued high prices for the crude steel have made prices on these two products very firm. We quote steel hoops for forward delivery at 1.50c. to 1.60c., and for prompt shipment at 1.60c. to 1.65c., at mill. Steel bands are 1.45c to 1.50c., on contracts, and from 1.60c. to 1.65c. for prompt shipment.

Spelter.—The market is dull and weak. We quote prime grades of Western at 5.50c. to 5.55c., East St. Louis, the freight to Pittsburgh being 12½c. per 100 lb.

Spikes.—Specifications against contracts are active and the railroads are taking out spikes freely on contracts placed last fall for delivery up to next July and later. Small railroad and boat spikes are in fairly active demand and prices are firm. We quote standard sizes of railroad spikes, 4½ x 9-16 in. and larger, at $1.70 for Western shipment and $1.75 for local trade. Boat spikes are firm at $1.75, base, and small railroad spikes at $1.75, base. These prices are for carload and larger lots.

Shafting.—New orders for shafting are coming in at a good rate and specifications against contracts are being received fairly freely by the mills. We are advised that discounts are being absolutely maintained on shafting, these being on the basis of 55 per cent. off in carloads, and 50 per cent. in less than carloads, delivered in base territory.

Rivets.—Makers of rivets report that new orders are coming in more freely than for some time. Prices, as printed elsewhere in this issue, are being firmly held.

Wire Products.—Specifications against contracts for wire, wire nails and cut nails are not coming in very rapidly, while the new demand is also rather light. Jobbers loaded up last fall on these products, and owing to the severe winter weather their stocks have not moved out as well as anticipated. We quote wire nails at $1.85 in carload and larger lots; painted barb wire, $1.85; galvanized, $2.15; annealed fence wire, $1.65; galvanized, $1.95, and cut nails, $1.85, all f.o.b. cars, Pittsburgh, usual terms, with full freight to destination added.

Merchant Pipe.—Jobbers are carrying pretty heavy stocks, which have not moved out as expected in the past three or four months, owing to the severe winter weather, with the result that new orders and specifications against contracts are coming in only at a fair rate. It is believed, however, that just as soon as favorable weather is here to stay the demand will show a material increase. The National Association of Jobbers of Wrought Pipe and Fittings, organized in this city a year ago, is holding its first annual convention here this week. About 165 jobbing houses are represented and considerable interest attaches to this convention. On Wednesday afternoon the delegates make a trip of inspection to the McKeesport works of the National Tube Company and on Thursday will go to Youngstown to inspect the plant of the Youngstown Sheet & Tube Company. Some of them have never seen the process of making pipe, and these two trips are expected to prove of much interest.

Boiler Tubes.—Some fair sized new orders are being placed for locomotive and merchant tubes, while good specifications against contracts are being received by the mills. With the return of favorable weather, it is believed that the demand for both locomotive and merchant tubes will show a material increase. We are advised that discounts on tubes, printed elsewhere in this issue, are being held.

Coke.—Not much progress is being made in the move to establish a central selling agency for coke, and it is possible that the project may not go through after all. It is claimed that there are so many coke interests to conciliate that it is difficult to get them into an agreement. The output of coke in the Upper and Lower Connellsville regions last week was 467,311 tons, an increase over the previous week of nearly 6000 tons.

Iron and Steel Scrap.—We note a decidedly better movement in heavy steel scrap and prices have shown an advance. There has also been an active demand for low phosphorus melting stock, sales of 1500 tons or more having been made in this market recently. Steel car axles are scarce, being used in some cases by consumers in place of small billets, which are hard to obtain, while prices are high. There is no market for old car wheels. We have advanced prices on heavy steel scrap and note that one consumer outside of the Pittsburgh district has in the past week or so taken in fully 5000 to 6000 tons at prices ranging from $17 to $17.25, delivered. New scrap lists of the Norfolk & Western, Seaboard Air Line and Atlantic Coast Line have come out, which are somewhat larger than usual. Dealers quote about as follows, per gross ton, for delivery at Pittsburgh or elsewhere, as noted:

Heavy steel scrap, Steubenville, Follansbee, Sharon, Monessen and Pittsburgh	$17.00 to $17.25
No. 1 foundry cast	16.50 to 16.75
No. 2 foundry cast	15.50 to 15.75
Bundled sheet scrap, at point of shipment	14.00 to 14.25
Rerolling rails, Newark and Cambridge, Ohio, and Cumberland, Md.	18.00 to 18.25
No. 1 railroad malleable scrap	16.00 to 16.25
Grate bars	12.50 to 12.75
Low phosphorus melting stock	21.00
Iron car axles	26.50 to 27.00
Steel car axles	24.00 to 24.25
Locomotive axles	.... to ....
No. 1 busheling scrap	14.50 to 14.75
No. 2 busheling scrap	11.00 to 11.25
Old car wheels	17.00 to 17.25
Sheet bar crop ends	17.25 to 17.50
Cast iron borings	10.00 to 10.25
Machine shop turnings	12.00 to 12.25

We note sales of about 2000 tons of machine shop turnings to a Pittsburgh consumer at $12 to $12.25, delivered, and 1000 tons of borings at $10 to $10.25, delivered, also three different sales of 500 tons each of low phosphorus melting stock to local consumers at $21, delivered.

Chicago.

FISHER BUILDING, March 16, 1910.—(*By Telegraph.*)

The steel industry in the West is settling down in the harness for a long pull on the road of prosperity. The doubts of two months ago have been dispelled gradually by the appearance of new business, and in many branches of the industry the consumer is likely to have more occasion for worry during the coming year than the stockholders in steel mills. The first rush of the buying this month was regarded as a stocking up movement on the part of manufacturers and jobbers who had been carrying very light stocks. When the active demand culminated in the fall and the mills fell several months behind on deliveries, it was still uncertain whether it would last; hence, during the winter buyers who could wait gave heed to the reports then in circulation regarding the reaction in business conditions throughout the country, which encouraged them to defer covering future requirements. March has come, however, and it is found that the mills in this part of the country have made no progress in catching up with the specifications on their books, but are farther behind than ever. This is particularly true of lines like bars on which even the Eastern mills represented here are sold up well into the summer, while the Western mills are booked even farther ahead. The second merchant mill at Gary, the 14-in., is now ready for operation, and will afford some relief, along with the 18-in. mill, which has been in operation for three months, but the market is so broad that the addition of these two mills to the available production does not go far. For three months manufacturers have been paying premiums on bars for prompt delivery for the small lots which they can get from a bar iron mill, and many of them buy from store. The same condition prevails in merchant steel, and the railroad and building construction which is now certain to be placed will fill the fabricating shops for the summer. The advance information which has been given in this correspondence for several weeks regarding railroad purchases is being confirmed fully by business placed or coming forward. In wire products the construction of new mills has been looked upon as a bearish feature of the future market, but the additional capacity may be needed to meet the agricultural demand, with the farmers getting $11 for hogs. The scrap market is a little more active, as the two leading rolling mill interests in this market took a large tonnage under contract from dealers last week for spring delivery. The consumptive demand for copper and other metals is quiet. In the coal trade the wage contracts between the operators and miners will expire March 31, and it is now expected that the mines will close in the competitive districts of Illinois, Indiana, Ohio and western Pennsylvania. The miners are asking higher wages, which the operators are unwilling to grant, because they are not sure of being able to protect themselves by obtaining higher prices from railroads, industrial consumers and the public. On previous occasions when the operators have conceded an advance, they have been embarrassed for a long time by inability to advance the market price, and a change in labor cost requires a general readjustment in the market. The principal mines in West Virginia and Kentucky are nonunion and will not be affected, but outside of them the shutdown will be quite general. The railroads and the industrial consumers have accumulated stocks which will carry them 60 to 90 days or perhaps longer, and no shortage of coal is anticipated in the Chicago market or the West.

Pig Iron.—The pig iron market persists in going in a direction opposite to the conditions which prevail in the steel industry. Last week Southern iron had become a little firmer, and it seemed as though all of the certificate iron that was available at $13 had been closed out, leaving $13.50, Birmingham, as the best price that could be done for early delivery for Southern iron, except for concessions on high phosphorus Tennessee iron. The improvement was only temporary, however, as there is not enough buying to take care of the iron which the Southern furnace interests are forcing on the market, and there is enough No. 2 foundry being offered this week at $13, Birmingham, for spot shipment, to make the market quotable at that figure for March. The surplus of Southern iron, however, consists chiefly of the higher foundry grades, as the pipe foundries have been large buyers through the winter of the lower grades. The spread is only 25c. between No. 2, No. 3 and No. 4, and gray forge is quoted in the Chicago market at the same price as No. 4. The reaction in price is bringing in quite a stream of small orders from foundries, as well as a few inquiries of good size covering the mixed requirements of consumers, including Northern and Southern iron. Northern foundry iron for Chicago delivery is quoted 25c. lower this week, making a decline of 75c. from the prices quoted in January and February; but this latest concession does not apply to malleable Bessemer, which is relatively stronger than Northern foundry. The decline in Northern foundry has come in an erratic course from the South. The southern Ohio furnaces, feeling more directly the competition from the South, have been aggressive all winter in seeking business, and have made concessions. On February 1 there was a reduction in freight rates from southern Ohio furnaces to territory west of Chicago, but not applying to Chicago. The local furnaces, to hold their trade in the manufacturing district west of Chicago, which obtained this 70c. reduction from southern Ohio, have quoted as low as $18.25, Chicago, and this price is now being done in the switching district of Chicago to foundries near the furnaces which take a nominal switching rate. Buyers in the Chicago district whose plants take a higher switching rate are quoted proportionately higher prices on a divided basis. Not much business is being done in Northern iron, however, although there are several inquiries for round tonnages and there have been scattering sales of fair lots. In high silicon iron the situation is confusing. Some of the Jackson County furnaces continue quoting their January prices on carload inquiries, while others are quoting $1 lower on round lots. Bids which are out of line with current prices were made last week on a lot of 2400 tons of 10 per cent. high silicon iron, which was taken by a Chicago car wheel foundry, and there are unconfirmed advices of special prices on other business. The following quotations are for March shipment, Chicago delivery:

Lake Superior charcoal	$19.50 to $20.00
Northern coke foundry, No. 1	18.75 to 19.25
Northern coke foundry, No. 2	18.25 to 18.75
Northern coke foundry, No. 3	17.75 to 18.25
Northern Scotch, No. 1	19.25 to 19.75
Southern coke, No. 1	17.85 to 18.35
Southern coke, No. 2	17.35 to 17.85
Southern coke, No. 3	17.10 to 17.60
Southern coke, No. 4	16.85 to 17.35
Southern coke, No. 1 soft	17.85 to 18.35
Southern coke, No. 2 soft	17.35 to 17.85
Southern gray forge	16.85 to 17.35
Southern mottled	16.35 to 16.85
Malleable Bessemer	18.50 to 19.00
Standard Bessemer	20.40 to 20.90
Jackson Co. and Kentucky silvery, 6%	20.40 to 20.90
Jackson Co. and Kentucky silvery, 8%	21.40 to 21.90
Jackson Co. and Kentucky silvery, 10%	22.40 to 22.90

(*By Mail.*)

Billets.—There is no change in the situation in this market as consumers still obtain their supplies from Eastern mills.

Rails and Track Supplies.—The local mills report no sales of any magnitude for the past week. Light sections are in good demand for lumber and mining roads, and the railroads are urgent in their calls for track material. We quote standard railroad spikes at 1.85c. to 1.95c., base; track bolts and square nuts, 2.40c. to 2.60c., base, all in carloads, Chicago. Light rails, 40 to 45 lb., $27; 30 to 35 lb., $27.75; 16, 20 and 25 lb., $28; 12 lb., $29, Chicago.

Structural Material.—Only a small amount of structural business was actually closed in Western territory last week. The Colorado State Museum at Denver, 110 tons, went to Jackson & Richter of that city. The Elgin, Joliet & Eastern Railroad has ordered two plate girder bridges amounting to 100 tons from the American Bridge Company. While the week was a light one in structural business actually closed, there is a good demand for small lots of material and many large projects in the West are rapidly approaching the contract stage. Bonds have been advertised and will undoubtedly be subscribed within a short time for financing the Union Depot and terminals at Kansas City, for which plans are ready. This project will call for about 18,000 tons of steel, including the depot building, elevated tracks and approaches, and boulevard bridges. The Otis Bank Building in Chicago will require 6000 tons or more. Bids will close March 22 on a bridge over the Red River at Shreveport, La., which will require about 3000 tons. Prices are revised this week for Chicago territory to bring them in line with Pittsburgh quotations. We quote plain material from mill, 1.73c. to 1.78c., Chicago; from store, 2c., Chicago.

Plates.—Orders and inquiries from the railroads for steel cars are resulting in inquiries of the steel mills for deliveries of 100,000 to 150,000 tons of plates, and this covers only a small part of the prospective requirements of the car builders. A share of the business now inquired for will undoubtedly come to the local mill of the leading interest and furnish it with specifications well into the summer. Good business is developing from other sources in both sheared and universal plates. We quote mill prices at 1.73c. to 1.78c., Chicago; store prices, 2c., Chicago.

Sheets.—Owing to the fact that jobbers only cover 60-day requirements as a rule, the sheet mills are not sold as far ahead as the bar mills and other branches of the industry, but there is a fair volume of business all the time. We quote as follows, Chicago: No. 10 annealed, 1.93c.; No. 28 black, 2.58c.; No. 28 galvanized, 3.68c. Prices from store, Chicago, are: No. 10 blue annealed, 2.25c. to 2.35c.; No. 28 black, 2.90c. to 3c.; No. 28 galvanized, 4c. to 4.10c.

Bars.—The large yearly buyers of bars are not exerting much pressure to obtain prices for their next business year, as they are more concerned in getting deliveries on old specifications. The mills are not quoting openly beyond July, but the business on the books is gradually working over into the last half. A year ago the mills did not have enough on their order books to make a steady rolling schedule, but they are approaching another year in the bar trade in a condition that spells trouble for the consumer. Meantime the largest consumers occasionally have to go to a bar iron mill, which does a little business in soft steel bars, and pay a premium of 20c. per 100 lb. or more for prompt shipment. Unusual substitutions have been made in many cases by consumers who had to do something to complete goods in process of manufacture, and jobbers who carry large stocks have trouble in keeping material on hand to meet the extraordinary demands from store. In the face of this demand bar iron declined the first of the month, and it is now conceded that 1.45c., Pittsburgh, or 1.63c., Chicago, will be a fair price for soft steel bars when the mills are in shape to take the business. The demand for hard steel bars continues good, and the mills rolling this material from old rail stock can make deliveries in two to three months. Subject to the usual delay in delivery of soft steel bars, we quote as follows: Soft steel bars, 1.63c. to 1.68c.; bar iron, 1.55c. to 1.60c.; hard steel bars rolled from old rails, 1.60c. to 1.65c., all Chicago.

Rods and Wire.—The wire interests have had to exercise extreme care the past winter to apportion their shipments so that the industries using rods and wire could be kept in operation, and there is still more or less shortage of both rods and plain wire, although the situation is a little easier. The active spring distribution through the jobbing trade has now begun in nails, barb wire and fencing, and the country dealers are calling for shipments, although most of them are carrying large stocks which they bought during the fall and winter. When hogs bring $10 and $11 the agricultural demand for wire is certain to be of record breaking proportions. We quote Bessemer, open hearth and chain rods at $36, Chicago. Jobbers' carload prices, which are quoted to manufacturing buyers, are as follows: Plain wire, No. 9 and coarser, base, 1.83c.; wire nails, 2.03c.; painted barb wire, 2.03c.; galvanized, 2.33c., all Chicago.

Merchant Steel.—No new developments are reported in this line, and it is not expected that the annual contracts with the agricultural trade will come up before April. The mills are now four to eight months behind on specifications, and are anxious to postpone new contracting as much as possible.

Cast Iron Pipe.—Only one letting of water pipe of any moment is reported for last week, the United States Cast Iron Pipe & Foundry Company having taken 400 tons at Springfield, Ill. This interest, however, has taken orders from the railroads in the past couple of weeks for about 5000 tons of large sizes of culvert pipe. Routine inquiries are good and there is a fair demand for small lots of all sizes both in water, gas and culvert pipe. On current business we quote, per net ton, Chicago, as follows: Water pipe, 4-in., $28.50; 6 to 12 in., $27.50; 16-in. and up, $26.50, with $1 extra for gas pipe.

Metals.—There has been a fair demand the past week from consumers, chiefly for spot delivery, the activity reported last week having quieted down somewhat, especially in copper, in which consumers do not show much interest beyond their immediate requirements. The jobbing price of tin is lower this week, the first decided change in a number of weeks, the reduction being due to unusually large arrivals in New York. Spelter is holding steady and the smelting interests talk confidently of higher prices, although consumers are inclined to discount this feeling, as the bad weather conditions which interfered with production during the winter have given way to good weather for mining operations. We quote Chicago prices as follows: Casting copper, 13¾c.; lake, 14c., in carloads, for prompt shipment; small lots, ¼c. to ⅜c. higher; pig tin, car lots, 33c.; small lots, 35c.; lead, desilverized, 4.60c. to 4.70c., for 50-ton lots; corroding, 4.85c. to 4.95c., for 50-ton lots; in carloads, 2½c. per 100 lb. higher; spelter, 5.70c. to 5.80c.; Cookson's antimony, 10⅝c., and other grades, 9¾c. to 10¼c.; sheet zinc is $7.75, f.o.b. La Salle, in carloads of 600-lb. casks. On old metals we quote: Copper wire crucible shapes, 13¾c.; copper bottoms, 12c.; copper clips, 13½c.; red brass, 12¾c.; yellow brass, 10c.; light brass, 7c.; lead pipe, 4½c.; zinc, 5.25c.; pewter, No. 1, 23c.; tin foil, 26c.; block tin pipe, 28c.

Old Material.—There is a curious conflict of conditions in the scrap market this week. While the general feeling in the market is better, the dealers find it difficult to dispose of heavy melting steel or any kind of steel scrap, as the Gary yards are congested with material purchased the past winter, and the Inland plant has a larger stock than needed to cover its requirements for the immediate future. This leaves a narrow market in which to dispose of the usual offerings of melting and shoveling steel. The rolling mills, however, were liberal buyers last week, one interest having taken about 3000 tons at spot prices, while another interest which overbid the spot market about 50c., paying in the neighborhood of $15 for No. 1 wrought, undoubtedly took a much larger tonnage under contract from dealers. These transactions, however, have failed to put any life into a stagnant market, although they may check any further decline for the present by affording the dealers a contract market for spot material. A curious feature of the market is that while larger supplies of material may be expected in the near future, and this usually makes an easy market, the bids received by railroads on lists which closed last week range all the way from 25c. to 75c. above the prices which dealers have been getting recently for spot material. There may be a delay, however, in the annual spring flood of scrap, as the coal mines in the West are likely to shut down April 1 pending a dispute over wages. The railroad and coal mining interests will use for the storage of coal every car they can obtain up to April 1, so that cars of the type generally used for loading scrap will be scarce until the equipment required for storing coal is released during April. Meantime, however, consumers are generally well supplied with scrap, and there are no urgent inquiries except for specialties like steel car axles, which a few consumers can use in place of billets, and locomotive tires, which are sought by shovel manufacturers. A Western road which offered 800 tons of old car wheels on a list which closed last week received several bids, which would make the wheels cost a little over $17, delivered to any Chicago plant. Another railroad made a private sale of 500 tons of No. 1 wrought scrap at about $15. The following prices are per gross ton, delivered, Chicago:

Old iron rails	$19.00 to $19.50
Old steel rails, rerolling	17.75 to 18.25
Old steel rails, less than 3 ft	16.50 to 17.00
Relaying rails, standard sections, subject to inspection	24.00 to 25.00
Old car wheels	17.00 to 17.50
Heavy melting steel scrap	15.00 to 15.50
Frogs, switches and guards, cut apart	15.00 to 15.50
Shoveling steel	14.50 to 15.00

The following quotations are per net ton:

Iron angles and splice bars	$17.00 to $17.50
Iron car axles	21.50 to 22.00
Steel car axles	23.00 to 24.00
No. 1 railroad wrought	14.50 to 15.00
No. 2 railroad wrought	13.50 to 14.00
Springs, knuckles and couplers	14.00 to 14.50
Locomotive tires, smooth	18.50 to 19.00
No. 1 dealers' forge	12.00 to 12.50
Steel axle turnings	11.00 to 11.50
Machine shop turnings	9.75 to 10.25
Cast and mixed borings	6.50 to 7.00
No. 1 busheling	12.00 to 12.50
No. 2 busheling	9.50 to 10.00
No. 1 boilers, cut to sheets and rings	11.00 to 11.50
No. 1 cast scrap	14.50 to 15.00
Stove plate and light cast scrap	12.50 to 13.00
Railroad malleable	14.50 to 15.00
Agricultural malleable	13.00 to 13.50
Pipes and flues	11.00 to 11.50

Philadelphia.

PHILADELPHIA, PA., March 15, 1910.

The markets generally have a somewhat quieter appearance. Prices, however, show little variation, and the undertone continues good. The sympathetic strike of union labor in this city has not affected manufacturing operations seriously. In many instances, particularly as far as the iron molders are concerned, the men returned to work after a short period of idleness. The situation, however, has had a depressing effect on business, and the purely local market has been less active, further developments being awaited. Little business has been done in pig iron, foundry grades showing practically the only movement, in which the cast iron pipe makers have been the most active. In some lines of finished materials a trifle more business is reported, but the demand continues irregular. Old material shows a tendency toward better conditions, particularly in rolling mill stock.

Pig Iron.—Inquiries from the cast iron pipe foundries for various grades of foundry iron continue the feature of the market. Some business has been closed, but a larger amount is still pending. Negotiations are under way for an aggregate of probably 20,000 tons, largely low grade iron, although some No. 2 plain and forge iron is included in the inquiries. Buyers' ideas of prices are considered, in most cases, as too low to induce sellers to take orders, but there is no doubt that some pretty low figures have been named for off-grade irons. In the higher grades of foundry iron business has been more irregular. Buyers, in instances, placed orders several weeks ago for near future requirements and have withdrawn from the maket, and recent sales have been confined more particularly to small spot lots. The leading makers are inclined to hold prices a trifle more firmly, standard brands of No. 2 X foundry being quoted for shipment during the next few months at $18.25 to $18.50, delivered in this vicinity, with No. 2 plain at $17.75 to $18. Good analysis iron can, however, be had at $18, delivered, for No. 2 X grade, and $17.50 for No. 2 plain. There is some inquiry for these grades for more extended delivery, and, while a number of makers are still refusing to name quotations for third quarter or last half shipment, it is believed that in some cases the same prices would be accepted for at least early third quarter shipment as are named for second quarter delivery. There has been no pronounced activity in Virginia foundry irons; moderate sales of No. 2 X and No. 2 plain are reported at the recent quotations, to which makers are adhering comparatively firmly. Outside the leading interest, Virginia pig iron makers have little iron to offer, being pretty well sold up for the next few months, and are not showing any disposition to take orders for extended forward deliveries. Statistics presented at a recent meeting of the Virginia Pig Iron Association show the tonnage of unfilled orders as well as the total stocks of iron on furnace banks to have been practically stationary as compared with the previous month. While there has been little business done with the general foundry trade in Southern iron, sales of low grade iron to cast iron pipe foundries are reported, prompt No. 2 Southern foundry being still held on the $13, Birmingham, basis. The movement in forge iron, for rolling mill purposes, has been at a standstill, under which circumstances recent quotations for straight forge have been nominal. Makers in this territory, however, state that in view of low prices named to cast iron pipe foundries for this grade, their asking price for straight forge iron would be in the neighborhood of $17, delivered, with probabilities that this would be shaded if a desirable tonnage came out. The steel making grades of iron have been extremely quiet. Basic consumers are pretty well covered for the second and, in some instances, the third quarter, and show little interest in the market. Offerings of prompt Western resale basic at $18.25, delivered in this vicinity, have not resulted in any business being booked. Eastern basic makers adhere to the nominal quotation of $18.50, delivered. No important demand for low phosphorus iron is reported. The shortage of ores of this grade is still pronounced, and one seller is entirely out of the market on that account. While there has been some little inquiry for forward deliveries, particularly for foundry grades, the tendency to place or accept such business is not pronounced, it being believed that the inquiries have been made largely with the view of testing the market for such delivery. Quotations for shipment for the remainder of the first half show practically no change, the following range being named for deliveries in buyers' yards, eastern Pennsylvania and nearby points:

Eastern Pennsylvania, No. 2 X foundry	$18.00 to $18.50
Eastern Pennsylvania, No. 2 plain	17.50 to 18.00
Virginia, No. 2 X foundry	18.25 to 18.50
Virginia, No. 2 plain	18.00 to 18.25
Gray forge	17.00
Basic	18.50
Standard low phosphorus	23.00 to 24.00

Ferromanganese.—There has been no inquiry from consumers in this territory. Western buyers have been feeling the market in a small way, but no business has resulted. Quotations are nominally named about $43, Baltimore.

Billets.—New business is mostly in small lots. Specifications on contracts come out satisfactorily, and in many instances deliveries are being urged. Forging billets are in good demand, particularly from Western consumers, who are constantly placing orders for moderate quantities. Ordinary rolling steel for delivery in this vicinity is firm, at $30.00, delivered. Forging billets are quoted from $32 to $34, Eastern mill, dependent on analysis, tonnage and delivery.

Plates.—The demand has been somewhat irregular, but the amount of business taken averages up fairly well. Eastern makers shared some good business with Western mills for about 3000 tons of boat plates; other contracts of considerable size are also pending. As a rule, Eastern mills can now make good deliveries on nearly all classes of plates, which is frequently a factor in securing business. For business of an ordinary character 1.75c., delivered, is pretty firmly adhered to for deliveries in this vicinity. For exceptionally desirable business, however, or where good delivery is not a factor, this price can be shaded, 1.70c., delivered, having been done in some cases.

Structural Material.—The immediate demand has not been heavy, the bulk of the business recently placed having been of a miscellaneous character. Several projects of about 1000 tons each are pending, but no large business has been recently placed in this district. Mills continue fairly active on orders previously in hand. Quotations are unchanged, 1.70c. to 1.75c. being named for plain shapes, delivered in this vicinity.

Sheets.—There is a good demand for reasonable early delivery, and specifications against contracts have been very heavy. The constant strong demand is taken as indicative of a steadily increasing consumption. Mills are well supplied with orders and are operating at full capacity, and on some sizes deliveries are delayed. Prompt shipments still command a slight premium; for reasonable deliveries, however, the following range of prices is named: Nos. 18 to 20, 2.80c.; Nos. 22 to 24, 2.90c.; Nos. 25 and 26, 3c.; No. 27, 3.10c.; No. 28, 3.20c.

Bars.—A slightly better demand for refined iron bars is reported; orders, however, are usually for small quantities for comparatively early shipment. Specifications come out freely for steel bars, but makers are still considerably behind on deliveries. While prices of refined iron bars are unchanged, they are a trifle firmer. Some makers still hold at figures above the market, 1.57½c. to 1.67½c., delivered, representing about the range of quotations. Steel bars are quoted at 1.60c. to 1.65c., delivered, but satisfactory deliveries are hard to obtain.

Coke.—Purchases are, to a great extent, confined to near future requirements, buyers refraining from making contracts under present circumstances. Prices are weak, although some brands are firmly held at figures which are above the market. Foundry coke ranges from $2.50 to $3.25 per net ton, at oven, although the bulk of the business done has been around $2.50 to $3. Furnace coke is quiet at $1.75 to $2.25. For delivery in this territory the following range of prices per net ton is named:

Connellsville furnace coke	$4.00 to $4.50
Foundry coke	4.75 to 5.50
Mountain furnace coke	3.60 to 4.10
Foundry coke	4.35 to 5.10

Old Material.—While there has been but little buying, more interest has been shown in the market, particularly for the rolling mill grades. The associated steel mills have taken on no further tonnages through their local representative, although there has been some little buying of heavy melting steel by merchants, to apply against earlier contracts. Railroad wrought and wrought iron pipe have moved up slightly, owing to the improved demand; while turnings and borings have receded slightly, owing to better supplies. Quotations, however, are still largely nominal, the following range about representing the market for near future deliveries in buyers' yards in this vicinity:

No. 1 steel scrap and crops	$16.50 to $17.00
Old steel rails, rerolling	17.50 to 18.00
Low phosphorus	22.50 to 23.00
Old steel axles	22.50 to 23.50
Old iron axles	27.50 to 28.00
Old iron rails	20.50 to 21.50
Old car wheels	16.75 to 17.25
No. 1 railroad wrought	19.00 to 20.00
Wrought iron pipe	16.25 to 16.75
No. 1 forge fire	15.00 to 15.50
No. 2 light iron	10.25 to 10.75
Wrought turnings	12.75 to 13.25
Cast borings	11.00 to 11.50
Machinery cast	16.00 to 16.50
Railroad malleable	16.00 to 16.50
Grate bars	13.50 to 14.00
Stove plate	12.50 to 13.00

The United Engineering & Foundry Company, Pittsburgh, is arranging to increase the capacity of its several plants in the Pittsburgh district, and is taking bids on the installation of additional equipment in the line of machine tools, cranes and motive power.

Cincinnati.

CINCINNATI, OHIO, March 16, 1910.

Sentimentally the market in every line save old material shows a strengthening tendency. There is a disposition on the part of large consuming interests to feel the market on pig iron for last half requirements. Finished material is particularly strong, and warehouse business in this territory is excellent. Coke is stronger. In old material alone is there weakness, which does not seem to diminish with time. Showing the interest in finished lines, the experience of a large agency in this market in a search for open hearth steel billets is significant. For a customer who wanted a supply seven or eight large mills in this territory were solicited, and the information gained was that they had nothing to offer.

Pig Iron.—There is more certainty as to the price of both Northern and Southern iron for spot and early shipment; furnace companies in both districts seem to have made concessions. It is largely a buyer's market, and shrewd consumers are busy putting up business to the makers, with the ironmaster located nearest the buying zone availing himself of his advantage in freight differentials. Considerable business is likely to be booked within the next week, based on the present low levels. The price of $13, Birmingham, for March, April and May delivery is rather well established on the Southern product, but a number of leading Southern producers still maintain $13.50 as their minimum price. The line of demarcation between Southern speculative and furnice iron is somewhat confusing, for there is undoubtedly still some of the former offered. There appears to have developed a competitive spirit among the Northern producers that did not exist a few days ago, for these furnaces now seem to be rather closely bunched in the race for business at the flat price of $16.50, Ironton, for the remainder of the year, and there is no doubt that $16 is being done on business offered for the middle months of the year. The largest inquiry in this market to-day is for the last half requirements of a large Springfield, Ohio, melter, between 1100 and 1200 tons of Nos. 2, 3 and 4 foundry, Northern and Southern. This business will be closed on Friday. A local foundry closed on 400 tons of Southern iron running 1 to 1.50 silicon, under 0.06 in sulphur, phosphorus not over 1.25, for the last half at around $12.25, Birmingham. A large manufacturer of stoves in Detroit is credited with having bought 1000 tons of foundry running 4 to 5 per cent. silicon at around $14, Birmingham. A local manufacturer of sanitary appliances is figuring on some Southern iron for delivery from April to August, and for this iron the furnace quoted a minimum of $13.50 for No. 2. A strenuous effort is being made by leading Southern interests to ward off $13 for second quarter deliveries, but it is acknowledged that a few, having a favorable freight differential, are taking on business at this figure. The sold-up condition of the larger makers of charcoal irons has caused a large producer to advance the price to $23, Birmingham, but this can still be shaded 50c. Forge and lower grades of foundry are still scarce, and for forge $12.25, Birmingham, can easily be secured. For March, April and May delivery, based on freight rates of $3.25 from Birmingham and $1.20 from Ironton, we quote, f.o.b. Cincinnati, as follows:

Southern coke, No. 1 foundry	$16.75 to $17.25
Southern coke, No. 2 foundry	16.25 to 16.75
Southern coke, No. 3 foundry	15.75 to 16.25
Southern coke, No. 4 foundry	15.50
Southern coke, No. 1 soft	17.75
Southern coke, No. 2 soft	17.25
Southern gray forge	15.75
Ohio silvery, 8 per cent. silicon	20.20
Lake Superior coke, No. 1	17.70 to 18.20
Lake Superior coke, No. 2	17.20 to 17.70
Lake Superior coke, No. 3	16.70 to 17.20
Standard Southern car wheel	25.25 to 25.75
Lake Superior car wheel	22.25 to 22.75

(By Mail.)

Coke.—Producers seem disinclined to quote as yet on last half business, and it is the impression that prices for this delivery will scarcely be available before May 1. Business in the foundry grades is good and the market is, if anything, a trifle firmer. Connellsville furnace grades are quotable at $1.90 to $2.25 per net ton, at oven, for spot and $2.25 to $2.40 on contract. Connellsville foundry ranges in price from $2.60 to $3, according to quality and deliveries. Wise County furnace brands are selling at $1.90 to $2.10 for prompt delivery, and for forward delivery there is so little interest that a price is hardly available. Wise County foundry grades are quotable at $2.65 to $3. Pocahontas and New River brands of foundry coke are quotable at about $2.75 to $3. Shipments are quite satisfactory, both from the ovens and railroad viewpoint, and specifications on foundry contracts are good.

Finished Iron and Steel.—Warehousing trade continues excellent and prices of material from stock hold firm. Little new business in the line of structural shapes is in sight, but engineering concerns report that they are working on a number of new and important projects for consideration soon. The largest new deal in the structural line in this market is the rebuilding of burned portions of the Union Distilling Company's plant in Carthage, Ohio. For these structures, which are to be mainly of reinforced concrete, there will be about 150 tons of steel used, exclusive of the twisted bars for concrete work. The Schreiber & Sons Company secured the contract for the steel and iron work and the Ferro-Concrete Construction Company the other portions. Deliveries of bars and structural material from the mills are much better; so much so that some sizes may now be obtained from stock. Some premium business is still heard of in connection with sheets for very quick delivery. Iron bars are weak and are quotable at 1.50c. to 1.55c., Cincinnati, while dealers are asking 1.75c. to 1.80c. out of stock. Specifications against contracts on sheets are good, and there is an accumulation of inquiries for third-quarter prices. Current prices are quoted at the Pittsburgh base, to which is added 15c. freight.

Old Material.—Relayers constitute the only item in which it can be said there is any interest. Mills are ignoring the dealers, and such business as is going seems to be mainly between dealers, who evidence the most implicit faith in an increasingly active market about the middle of the year. Local dealers are taking some small tonnages from railroad offerings of the week at attractive prices. In the absence of actual transactions the following quotations are submitted as about representative of the market:

No. 1 railroad wrought, net ton	$13.50 to $14.00
Cast borings, net ton	7.00 to 7.50
Heavy melting steel scrap, gross ton	14.00 to 14.50
Steel turnings, net ton	9.00 to 9.50
No. 1 cast scrap, net ton	12.50 to 13.00
Burnt scrap, net ton	9.00 to 10.00
Old iron axles, net ton	18.00 to 18.50
Old iron rails, gross ton	17.50 to 18.00
Od steel rails, short, gross ton	15.00 to 15.50
Old steel rails, long, gross ton	16.00 to 16.50
Relaying rails, 56 lb. and up, gross ton	23.00 to 24.00
Old car wheels, gross ton	14.00 to 14.50
Low phosphorus scrap, gross ton	17.00 to 17.50

Hickman, Williams & Co. have been appointed exclusive selling agents for the foundry and malleable pig iron made by the Ashland Iron Mining Company, Ashland, Ohio.

Attalla Furnace of the Eagle Iron Company, Chattanooga, blew in March 10 on charcoal pig iron. Eaton, Rhodes & Co., Cincinnati and Pittsburgh, have been appointed sole selling agents.

J. K. Dimmick & Co. have removed to new quarters in suite 701, Provident Bank Building, southeast corner Seventh and Vine streets, Cincinnati.

The Phelps Iron & Steel Company, Cincinnati, Ohio, sales agent for the Eastern Steel Company, has also been appointed Western agent of J. K. Dimmick & Co., Philadelphia, for the sale of pig iron, coal and coke. The Phelps Company has taken commodious quarters in the Provident Savings Bank & Trust Company Building, Vine and Seventh streets, Cincinnati.

Edward S. Kendrick has resigned the management of the Cincinnati office of J. K. Dimmick & Co. to engage in business on his own account under the style of Edward S. Kendrick & Co., with offices in the Traction Building, Cincinnati, in the sale of coke and pig iron.

Birmingham.

BIRMINGHAM, ALA., March 14, 1910.

Pig Iron.—There is an all round better feeling among producers of iron in this district. While prices have not changed, inquiries the past week were much better, and several sales of round lots were made. For instance, one of the largest producers reports one sale of 5000 tons and small lots ranging from 75 to 200 tons, aggregating 1500 tons. On the whole, however, sales were scattering. With the placing of the Westinghouse order there seems to have come a better tone. The placing of 20,000 tons about March 1, now known, also has had its effect, which is having more force at this time than earlier in the month. With the assurance of more open weather large pipe specifications are expected to come up soon for consideration. At present there is no firm established base price, but indications strongly point to $13.50 for second and third quarters and $14 for the balance of the year. Warrant iron seems to have passed to the background to a large extent and is not offered as freely as was the case during the week of March 3. Some few carloads were sold at $13, at the furnace, but sales were so scattering as to have practically no effect on the market. Taking the matter as a whole, it would seem that the bottom has been touched, and the trend is likely to be upward rather than lower. Charcoal prices are quoted at $22, at the furnace, for non-chilling grades, and $22.50 for chilling grades.

Cast Iron Pipe.—The demand for water pipe continues good, and several large contracts have been closed. Last week the city of Atlanta, Ga., bought 4000 to 5000 tons. It is also understood that the city of Portland, Ore., is in the market, and contract will be closed for its specifications within the next few days. Indications strongly point to a heavy business in the immediate future from the Middle West, as well as the extreme Western coast. Local manu-

facturers report a very satisfactory business, with prospects more encouraging as the favorable weather approaches. There has been no change in prices, and following are quoted, per net ton, f.o.b. cars at the plant here: 4 to 6 in., $25; 8 to 12 in., $24; over 12 in., average of $23, with $1 a ton extra for gas pipe.

Old Material.—Local dealers say that the general conditions in their line have been more encouraging the past week than at any time since the first of the year. There seems to be no trouble in making sales, but the difficulty in the past seems to have been due to buyers insisting on some material reduction in price. This to a certain extent has passed away, and some buyers in certain sections are more anxious to do business. Following prices are quoted, per gross ton, f.o.b. cars here:

Old iron axles	$19.50 to $20.00
Old iron rails	15.50 to 16.00
Old steel axles	18.50 to 19.00
No. 1 railroad wrought	14.00 to 14.50
No. 2 railroad wrought	11.50 to 12.00
No. 1 country wrought	11.00 to 11.50
No. 2 country wrought	11.00 to 11.50
No. 1 machinery	12.50 to 13.00
No. 1 steel	11.75 to 12.25
Tram car wheels	12.00 to 12.50
Standard car wheels	14.00 to 14.50
Light cast and stove plate	10.00 to 10.50

Cleveland.

CLEVELAND, OHIO, March 15, 1910.

Iron Ore.—From information obtained from merchant ore firms, it is estimated that about 85 per cent. of this season's output from the Lake Superior mines has been sold at present prices. With this satisfactory condition of the trade it is claimed that there is no possibility that prices will be shaded for this year's shipment. The market continues very quiet and dealers do not look for any activity during the next few weeks. We quote prices as follows: Old Range Bessemer, $5; Mesaba Bessemer, $4.75; Old Range non-Bessemer, $4.20; Mesaba non-Bessemer, $4.

Pig Iron.—The market is showing somewhat more activity and the general feeling is better, although prices are no firmer. On a last half inquiry for 400 tons of No. 2 a Valley furnace made a price quotation of $16.10, which seems to fairly represent the market at the present time, although some producers are refusing to quote under $16.50 for that delivery. For spot and second quarter shipment we quote No. 2 foundry at $16 to $16.25, Valley furnace. A local car wheel manufacturer is feeling the market for 15,000 to 20,000 tons of foundry iron for last half delivery. Actual inquiries show some improvement, but they are mostly for small lots, some for second quarter delivery and others for the last half. For early delivery local furnaces are quoting No. 2 at $17, delivered Cleveland, but in some cases $17.25 is being secured for carloads. Shipments are holding up well, but some iron is being piled by furnaces in this territory. The sale of a few small lots of Southern iron are reported at $13.25 to $13.50, Birmingham, for second quarter and third quarter delivery. A little resale iron was sold earlier in the week at lower prices. For spot shipment and second quarter we quote, delivered, Cleveland, as follows:

Bessemer	$18.90
Northern foundry, No. 1	$17.25 to 17.60
Northern foundry, No. 2	16.90 to 17.15
Northern foundry, No. 3	16.50 to 16.90
Gray forge	16.15 to 16.40
Southern foundry, No. 2	17.60 to 17.85
Jackson County silvery, 8 per cent. silicon	21.55

Coke.—The market is firmer and the general outlook appears more favorable. The increased demand for early delivery is attributed partly to the fact that some consumers wish to have stocks on hand should a suspension of mining operations take place April 1, pending a settlement of the wage scale between the coal operators and miners. Standard Connellsville furnace coke is held at $2.25 to $2.30 per net ton, at oven, for spot shipment, and $2.30 to $2.40 on contract. We quote 72-hour Connellsville foundry coke at $2.75 to $3 for prompt shipment and $3 on contract.

Finished Iron and Steel.—Specifications on contracts show some improvement, and some of the mill agencies report a considerable increase in the volume of inquiries, mostly for small lots. Consumers of steel bars are pressing the mills for deliveries, in many cases shipments not yet having been secured on October specifications. Deliveries on open hearth steel bars are harder to get at the present time than at any time since the present congested condition of the mills began. Prices on steel bars are firm at 1.45c. to 1.50c., Pittsburgh, the latter being the minimum price quoted by nearly all the mill agencies in this territory. One mill agency is booking some contracts for third quarter delivery, but others have not yet opened their books for the last half. No inquiries are coming from the implement makers as yet, but these are expected to come into the market within the next few weeks for their steel bar requirements for the year beginning July 1. The demand for small lots of plates for early delivery has improved, and mills that have been actively looking for this business are unable to promise as good deliveries as a few weeks ago, although shipments can be secured in from three to four weeks. Plates are quoted at 1.55c. to 1.60c., Pittsburgh, but an Ohio maker of tank work who has an inquiry out for 1500 tons in very desirable sizes for delivery until October 1, claims to have been quoted a price under 1.55c. The structural situation shows an improvement. Local makers of heavy handling machinery report an increase in orders, and inquiries for work requiring considerable tonnage in structural shapes, plates and bars. In building lines a fair volume of small structural work is coming out, the material for which fabricators have under contract. Architects are working on plans for a number of good sized buildings, for which the material will be purchased shortly. The C. H. Fath & Son Construction Company, Cleveland, has been awarded the contract for the Cherry street bridge in Toledo. This will be a large concrete bridge that will require considerable steel. The demand for sheets continues active and prices are firm. The demand for iron bars is fairly active and local mills are well filled with orders. We quote iron bars at 1.50c. to 1.55c., Cleveland, but these prices have recently been shaded somewhat for shipment to outside points. Jobbers report that the volume of warehouse orders for all kinds of finished material continues heavy.

Old Material.—The market continues quiet. The mills are taking scrap freely on contract, but are doing no buying except in odd lots. Consumers still appear to be pretty well covered with contracts. Some of the larger producers are unwilling to sell their scrap at present prices and are storing it. The demand from foundries for cast scrap is light. The general feeling appears to be somewhat better and prices are slightly firmer, although no change is made in recent quotations. Prices, per gross ton, f.o.b. Cleveland, are as follows:

Old steel rails	$16.00 to $16.50
Old iron rails	18.00 to 18.50
Steel car axles	20.00 to 20.50
Heavy melting steel	15.00 to 15.50
Old car wheels	16.50 to 17.00
Relaying rails, 50 lb. and over	22.50 to 23.50
Agricultural malleable	14.00 to 14.50
Railroad malleable	16.00 to 16.50
Light bundled sheet scrap	10.50 to 11.00

The following prices are per net ton, f.o.b. Cleveland:

Iron car axles	$21.00 to $21.50
Cast borings	8.25 to 8.50
Iron and steel turnings and drillings	9.00 to 9.50
Steel axle turnings	11.00 to 11.50
No. 1 busheling	13.00 to 13.50
No. 1 railroad wrought	15.00 to 15.50
No. 1 cast	14.25 to 14.75
Stove plate	12.00 to 12.50
Bundled tin scrap	11.00 to 11.50

Buffalo.

BUFFALO, N. Y., March 15, 1910.

Pig Iron.—Inquiry is rather more active, especially for foundry grades, and a fairly good run of new orders is coming in, mostly for small lots. Foundry operations of consumers tributary to this market keep up well as to aggregate melt, and there is no slackening of shipments on contracts, which continue heavy. In basic the market has been dull, with no sales of importance. There has been practically no change in the schedule of prices, although there is a disposition on the part of some furnaces, in cases where good sized tonnages are involved, to consider slightly less than the prices shown in the schedule given below, which, however, represents as nearly as possible the basis of prices for this district for the remainder of the first half and third quarter deliveries, per gross ton, f.o.b. Buffalo:

No. 1 X foundry	$17.50 to $18.00
No. 2 X foundry	17.00 to 17.50
No. 2 plain	17.00 to 17.25
No. 3 foundry	16.75 to 17.00
Gray forge	16.50 to 16.75
Malleable	17.50 to 18.00
Bessemer	19.50 to 19.75
Basic	18.00 to 18.50
Charcoal	20.50 to 21.00

Finished Iron and Steel.—There is renewed activity in bar material and the actual orders for new business on the books have again reached a point where they are in excess of the mill output. Hoops are firmer, both here and in Canada, and in black and galvanized sheets the demand is increasing, with indications of a very large spring business. The demand for tin plate and tin mill products is heavy, and mills are running behind their schedules on bookings for first half deliveries. Many consumers are anticipating their requirements four or five months, and contracts for these products are now being placed for third quarter deliveries. In structural material there is a lively demand for small lots from warehouse, and it is expected that specifications for fabricated material for a number of new building projects will soon be on the market. Bids will shortly be received for a new theatre at Rochester which will take about 200 tons of steel; also for the steel needed for the enlarged plant of the Erie City Iron Works, Erie, Pa., 500 to 600 tons. Specifications are now being prepared for the structural steel required for the factory and forge buildings of the Superior Motor Vehicle Company, Buffalo, taking 150 to

200 tons. The Buffalo Structural Steel Company has been awarded contract for fabrication and erection of the 450 tons of structural steel required for the new 65-ton open hearth furnace plant which the New York State Steel Company is building here. The Lackawanna Steel Company will furnish the steel.

Old Material.—No new business of any moment has been placed; such purchases as have been made by consumers being simply to cover immediate special needs, the mills holding off until the market has settled and their stocks are more fully used up. Dealers are only purchasing sufficient material to take care of old contracts, most of which are rapidly reaching completion. Borings and turnings are lower. We quote as follows, per gross ton, f.o.b. Buffalo:

Heavy melting steel	$15.50 to $16.00
Low phosphorus steel	19.50 to 20.00
No. 1 railroad wrought	16.50 to 17.00
No. 1 railroad and machinery cast scrap	15.50 to 16.00
Old steel axles	20.00 to 20.75
Old iron axles	24.00 to 24.50
Old car wheels	16.00 to 16.50
Railroad malleable	16.50 to 17.00
Boiler plate	13.00 to 13.50
Locomotive grate bars	12.00 to 12.50
Pipe	12.50 to 13.00
Wrought iron and soft steel turnings	9.00 to 9.50
Clean cast borings	8.00 to 8.50
No. 1 busheling scrap	13.50 to 14.00

St. Louis.

ST. LOUIS, March 14, 1910.

Inasmuch as the principal business of St. Louis is with the Southwest, the development of that section of the country is a matter of prime importance to this city. Notwithstanding the fact that that territory has made a larger advance in material development than any other part of the United States during the past 10 years, advices are constantly being received of its continued substantial progress, notably in the direction of the extension of its railroad facilities, through the development of its agricultural industry and the corresponding enlargement of its productive area. And while this expansion enlarges the territory for which St. Louis is the natural market, it broadens the opportunity for its manufacturers and jobbers to increase their business with producers in other sections of the country.

Coke.—There is some inquiry for round lots of coke, one house reporting an application for price on 50 carloads for shipment over the year, and a sale of 10 carloads for April shipment, but most houses are getting only a run of small orders. While prices remain nominally unchanged, firm offers of a trifle less could probably be worked. We quote for standard 72-hour foundry for prompt shipment, $2.75; for season shipment, $3 per net ton, f.o.b. oven Connellsville.

Pig Iron.—Inquiry developed that the local steel foundry referred to in the previous report has increased its purchase of basic iron 4000 tons. One house reports an inquiry for 600 tons of Southern foundry for shipment over the first half and another booked an inquiry for 700 to 1000 tons of high manganese for shipment over the last half. A leading house mentions inquiries aggregating 2200 tons of foundry and high silicon for second half delivery, but intimated that many of these applications were doubtless for the purpose of keeping posted on the market. A feature of the situation is the receipt of offers much out of line, mostly for last half shipment. It is assumed by large buyers that as production is likely in excess of the present demand and iron is being piled up in the yards, there is no occasion for largely anticipating their wants. Notwithstanding the dullness prevailing the past week, prices hold steady, barring some offerings of resale iron for prompt shipment and some sales on private terms. The market for the last half is especially strong, though it is intimated that overtures for the third quarter lead to a belief that some concessions might be made. We quote for Southern No. 2 foundry for shipment over the remainder of the first half, $13.50; for shipment over the last half, $14, f.o.b. Birmingham. Southern Ohio is offered at $17, f.o.b. furnace.

Lead, Spelter, Etc.—The market for lead is ruling quiet and easy at 4.35c. to 4.40c.; spelter is in slow demand, but steady at 5.60c., East St. Louis. Zinc ore is more active and strong at $45 to $46 per ton, Joplin base. Tin is lower, 65c. per 100 lb. decline; antimony stationary; copper 10c. per 100 lb. lower. The demand for finished metals shows an improvement over the previous week.

Old Material.—It is still a dealers' market on scrap iron and steel, consumers holding off. Dealers are watching the course of the pig iron market, both as to price and demand, and predicate a renewal of activity in their line with a change for the better in the former. They base larger offerings of scrap by the railroads in the near future on the purchases being made for new material to take the place of worn out rolling stock, which in turn will bring business to mills and foundries and lead to a demand for their holdings. Stocks are comparatively small and offerings light, the only railroad list reported for the past week being 150 tons offered by the Cotton Belt Railroad. The tone of the market is weak, though prices are nominally unchanged. We quote dealers' prices, per gross ton, f.o.b. St. Louis, as follows:

Old iron rails	$15.50 to $16.00
Old steel rails, rerolling	15.00 to 15.50
Old steel rails, less than 3 ft	13.50 to 14.00
Relaying rails, standard sections, subject to inspection	26.00 to 26.50
Old car wheels	15.50 to 16.00
Heavy melting steel scrap	13.50 to 14.00
Frogs, switches and guards, cut apart	13.50 to 14.00

The following quotations are per net ton:

Iron fish plates	$14.00 to $14.50
Iron car axles	20.50 to 21.00
Steel car axles	19.50 to 20.00
No. 1 railroad wrought	14.00 to 14.50
No. 2 railroad wrought	13.00 to 13.50
Railway springs	12.50 to 13.00
Locomotive tires, smooth	16.50 to 17.00
No. 1 dealers' forge	11.00 to 11.50
Mixed borings	7.00 to 7.50
No. 1 busheling	12.00 to 12.50
No. 1 boilers, cut to sheets and rings	10.50 to 11.00
No. 1 cast scrap	13.00 to 13.50
Stove plate and light cast scrap	9.50 to 10.00
Railroad malleable	12.00 to 12.50
Agricultural malleable	9.75 to 10.25
Pipes and flues	10.50 to 11.00
Railroad sheet and tank scrap	9.00 to 9.50
Railroad grate bars	10.50 to 11.00
Machine shop turnings	10.50 to 11.00

The Union Bridge Company, Kansas City, certifies to an increase of capital from $50,000 to $100,000.

The stockholders of the Manufacturers' Railroad, whose headquarters is at St. Louis, are arranging to capitalize the road for $5,000,000, and issue bonds for a like sum for the purpose of carrying out plans already matured for a system of east and west side terminals at St. Louis. The company has secured ample ground for a site for a union freight station and freight yards on the St. Louis side of the river and also for east side terminals. A ferry system will be utilized for crossing the river.

The plant of the Lead Products Company at 3215 Papin street was destroyed by fire March 10; loss estimated at $100,000.

The American Car & Foundry Company is in receipt of large orders for new cars from various railroads and it is likely that before the end of March the company will have booked sufficient business to carry it well into fall with all plants pushed to their capacity.

The German Iron Market.

BERLIN, March 3, 1910.

The news from the iron industry is rather scanty this week. The most satisfactory thing from the producer's standpoint is an advance in the price of bar iron. The association of manufacturers met about the end of last week and voted a raise of 2 marks for the general market and 4 marks for South Germany. This brings the minimum price up to 110 or 112 marks, according to the point from which shipment is made. At the meeting it was shown that the mills are nearly sold out for the June quarter. For that quarter the increased price only applies to new orders.

Another piece of news that has made a good impression on the stock market is the extension of the pig iron syndicate of the Silesian district to include the entire eastern part of the Empire. The thing of greatest significance in this connection is that the Kraft Works, located near Stettin, has joined its fortunes with that organization. This concern has for some years stood aloof from all trade combinations and in its price policy it made a great deal of trouble for them. It was first established in Germany to demonstrate the advantages of locating furnaces at tidewater, with a view of getting easiest access to Swedish ores and English coal and coke. This action increases the probability of securing a harmonious arrangement among the furnaces of the various districts, and from this view of the matter the news in question caused iron shares to rise. Otherwise the situation in the pig iron market is very quiet.

Outside news tends to promoting a waiting and watching attitude among manufacturers. In Belgium pig iron prices have begun to fall, although only a few weeks ago Belgian works were buying big amounts of iron in the Rhenish-Westphalian district because of the inability of home furnaces to supply the demand there. Within the past 10 days prices have fallen 1.50 to 4 francs per ton in that country. It is highly probable that the American market reports caused this reaction, though the telegraphed reports do not mention the cause.

It appears from recent reports that the position of iron foundries has improved to some extent. Various groups of manufacturers of commercial castings have recently held meetings and voted to raise prices, and it is expected that further groups will take similar action. It is mentioned that the situation is quite favorable so far as commercial castings are concerned, the various establishments being well supplied with orders. Machinery shops have begun to send in better orders, and the same is true of the building trades.

An advance of prices in this line of products was regarded as all the more necessary owing to the fact that many foundries have been barely able to earn profits for a year or two owing to the extremely low prices.

This week another company report has given great encouragement to the stock market. The Union Company of Dortmund issued a statement of its half yearly earnings, showing $580,000 for July-December, 1909, against $440,000 for the like period of 1908. Its orders on hand at the end of December amounted to 125,300 tons, against 86,700 at the end of 1908.

New York.

NEW YORK, March 16, 1910.

Pig Iron.—The market continues dull, with no advance indications of the genuine buying movement that has been so long awaited. Southern iron is still shipped into New England at prices below the level maintained by Buffalo district furnaces, and at the present low prices Southern brands may become more of a factor in the East. There was keen competition for the business recently placed by a New Jersey consumer with Southern furnaces, amounting to several thousand tons, for shipment in the next few months. Negotiations by Eastern cast iron pipe foundries are still under way and some low prices have been quoted on analysis irons, which in general are the equivalent of gray forge and No. 4 and No. 3 foundry. Some inquiry has come up for Buffalo iron for shipment into the Hudson Valley after canal navigation opens, and a few sales have been made. We quote Northern iron at tidewater as follows for early and second quarter shipment: No. 1, $18.50 to $18.75, No. 2 X, $18 to $18.25; No. 2 plain, $17.75. Southern iron for early delivery is quoted at $18 to $18.25 for No. 1 and $17.50 to $17.75 for No. 2.

Steel Rails.—There has been no buying as yet for New England roads, whose inquiries came up recently. The Southern Railway has placed a portion of its order, the Tennessee Coal, Iron & Railroad Company being credited with 42,000 tons. A small portion of this contract will be rolled in the Chicago district.

Ferroalloys.—Although there has been some delay in shipments of ferromanganese from abroad, and a few consumers have been put out on that account and have been obliged to buy for immediate use, there is not much trading in ferromanganese. It is being offered at $41 to $42, New York, and buyers seem to show no disposition to purchase for the last half at any price. Ferrosilicon is selling only fairly well, and it is being offered in this market at $62. It is in good supply.

Finished Iron and Steel.—The week has been quiet, but not discouragingly so, for there has been steady improvement since the first of the month. There has been more disposition to make contracts and the better feeling would have shown its effect in more business in finished iron and steel were it not for the labor disturbances and rather unseasonable weather. Steel bars are most active, and plates most quiet, and, although structural material has not been far ahead of plates lately, the last few days have seen signal improvement. New inquiries in the market for structural material are as follows: 5000 tons for the Big Four shops at Indianapolis; about 1500 tons for the Air Line bridge over the Connecticut River at Middletown for the New York, New Haven & Hartford Railroad, and 300 tons for additional work on the Philadelphia & Reading passenger station at Philadelphia. The following are being bid on: A pier shed for the Clyde Steamship Line at Jacksonville, requiring 700 tons, and a passenger station at Watertown, N. Y., for the New York Central, requiring 150 tons. Bids have gone in on a hotel at Reading requiring 1200 tons; on the Blackstone Theatre, Chicago, 450 tons; a hot metal bridge over the Schuylkill River at Swedeland, Pa., for the Marion & Rye Valley Railway, 1300 tons; and for track elevation in Indiana for the Pennsylvania Lines, 550 tons. Contracts have been closed on the following: A building in Newark for the Union Building Company, 1000 tons; the Union Trust Building, Jersey City, 400 tons, taken by the Snare & Triest Company; a theater in Jersey City, 300 tons, taken by the Hinkle Iron Company; an apartment house at Thirty-fifth street and Lexington avenue, New York, 350 tons, and the Mills & Gibb Building, New York, 1900 tons, both to be fabricated by the Levering & Garrigues Company, and the plain material for the second to be furnished by the Eastern Steel Company; trestle work for the New Jersey Zinc Company, 1200 tons, to be furnished by the Lackawanna Bridge Company; and the East Side High School in Newark, 300 tons, taken by the Hay Foundry Company. There are no new changes in prices. While there is report of some shading in the price of plates, the market may still be considered to be 1.71c. for both plates and shapes, with the minimum 1.66c. for desirable orders. Steel bars are quoted at 1.61c. to 1.66c. and bar iron at 1.65c. to 1.70c., all New York.

Cast Iron Pipe.—Although the demand cannot be characterized as heavy, the market for cast iron pipe is fairly active. A considerable volume of business is coming out from water and gas companies which do not make public lettings. The outlook is encouraging, and some of the pipe makers are asking slightly higher prices, being well supplied with orders. The contract for 2300 tons placed by the city of Boston last week went to a Delaware River plant. No important public letting is scheduled for the near future. Prices are continued at $25.50 to $26 per net ton, tidewater, for carload lots of 6-in.

Old Material.—About the only demand now coming to dealers is for the various grades of foundry scrap. The volume of business in this line is not large, but it shows up well by comparison with other branches of the old material trade. Malleable cast is especially strong. Little inquiry comes from rolling mills or steel works. The large rolling mills are well employed, and as they are using up their accumulations rapidly it is expected that they must shortly come into the market. The steel works in eastern Pennsylvania are still embargoed against receiving shipments of domestic scrap, and it cannot be learned how soon a demand for old material is likely to be expected in that direction. Under the circumstances it is somewhat surprising that prices do not recede, but evidently dealers are sufficiently hopeful of the early opening up of spring trade to maintain their position and are not sacrificing their holdings. It is probable, however, that when the demand does come prices may advance very little, if any, as the opportunity will be doubtless eagerly embraced for converting material into cash. The railroad offerings this month are not large, and the belief prevails that the railroad companies are holding back part of their accumulations for the purpose of preventing the market from being unduly depressed. The following quotations, which are per gross ton, New York and vicinity, about represent existing conditions:

Rerolling rails	$14.50 to $15.00
Old girder and T rails for melting	14.00 to 14.50
Heavy melting steel scrap	14.00 to 14.50
Relaying rails	20.50 to 21.00
Standard hammered iron car axles	23.50 to 24.00
Old steel car axles	19.00 to 19.50
No. 1 railroad wrought	16.00 to 16.50
Wrought iron track scrap	14.00 to 14.50
No. 1 yard wrought, long	14.00 to 14.50
No. 1 yard wrought, short	13.50 to 14.00
Light iron	8.00 to 8.50
Cast borings	9.00 to 9.50
Wrought turnings	10.50 to 11.00
Wrought pipe	13.50 to 14.00
Old car wheels	14.50 to 15.00
No. 1 heavy cast, broken up	14.00 to 14.50
Stove plate	11.00 to 11.50
Locomotive grate bars	11.00 to 11.50
Malleable cast	15.50 to 16.00

Iron and Industrial Stocks.

NEW YORK, March 16, 1910.

The market of the past week has shown a declining tendency, due to the fear of widespread labor troubles. The range of prices on active iron and industrial stocks from Thursday of last week to Tuesday of this week was as follows:

Allis-Chalm., com..	12⅛- 12¼	Pressed St., pref..	103 -103½
Allis-Chalm., pref..	45 - 46⅝	Railway Spr., com.	43 - 46
Beth. Steel, com...	29½- 31	Republic, com.....	39 - 41
Beth. Steel, pref.....	60	Republic, pref.....	102½-104
Can, com.....	11⅝- 12⅜	South. I. & S., com.	20⅝- 22
Can, pref.....	77½- 78⅞	South. I. & S., pref.	47 - 47½
Car & Fdry, com..	64 - 67½	Sloss, com.....	77 - 82
Car & Fdry, pref.....	118½	Pipe, com.....	25⅝- 26½
Steel Foundries...	60¼- 60½	Pipe, pref.....	76 - 78⅝
Colorado Fuel....	39⅝- 43	U. S. Steel, com...	84⅜- 89¼
General Electric...	154 -157¼	U. S. Steel, pref...	121⅝-122⅝
Gr. N. ore cert....	69 - 71⅝	Westinghouse Elec.	68½- 75⅛
Int. Harv., com...	90½- 92⅝	Am. Ship, com.....	75
Int. Harv., pref...	122 -122½	Chi. Pneu. Tool...	45 - 46
Int. Pump, com...	46 - 48⅛	Cambria Steel.....	48⅝- 49¾
Int. Pump, pref...	86 - 86⅛	Lake Sup. Corp...	24½- 25¼
Locomotive, com..	50½- 54½	Pa. Steel, pref....	112 -114
Locomotive, pref..	112½-113	Warwick	11⅛
Nat. En. & St.,com.	22⅝- 23	Crucible St., com..	15 - 16⅜
Nat. En. & St., pref.....	95	Crucible St., pref..	88½- 90⅝
Pressed St., com..	43¼- 45¾	Harb.-W. Ref., pref.	92½- 93

Last transactions up to 1 p.m. to-day are reported at the following prices: United States Steel common 84¼, preferred 120½, bonds 105; Car & Foundry common 63⅞, preferred 118½; Locomotive common 50½, preferred 113; Colorado Fuel 38¼; Pressed Steel common 42, preferred 102½; Railway Spring common 43; Republic common 39, preferred 103; Sloss-Sheffield common 76; Cast Iron Pipe common 23½, preferred 76; Can common 11⅝, preferred 76⅝.

Dividends.—The American Iron & Steel Mfg. Company has declared the regular quarterly dividend of 1¼ per cent. on the common stock and 1¼ per cent. on the preferred stock, both payable April 1.

Last week the directors of the Standard Underground Cable Company met at Pittsburgh and ratified a proposition to increase the capital stock of the company from $2,800,000 to $3,500,000. The purpose of the increase is to allow the directors to make a distribution of a 25 per cent. stock dividend.

The dividend of 31½ per cent. declared March 4 on the

$5,000,000 preferred stock of the Dominion Iron & Steel Company, Sydney, Nova Scotia, covers dividends Nos. 10 to 18, from April 1, 1906, to April 1, 1910, inclusive. This declaration followed the settlement of the litigation with the Dominion Coal Company, $800,000 being agreed on as the balance of the damages under the judgment rendered in court. Only the adjustment of the price of coal is left to be dealt with.

Metal Market.

NEW YORK, March 16, 1910.

THE WEEK'S PRICES.

Cents per pound.

	Copper.			Lead.		Spelter.	
Mar.	Lake.	Electrolytic.	Tin.	New York.	St. Louis.	New York.	St. Louis.
10	13.75	13.50	32.37½	4.55	4.40	5.73	5.58
11	13.75	13.50	32.20	4.52½	4.37½	5.73	5.58
12	13.75	13.50	....	4.52½	4.37½	5.73	5.58
14	13.75	13.50	31.70	4.50	4.35	5.73	5.58
15	13.75	13.50	31.70	4.50	4.35	5.73	5.58
16	13.75	13.50	31.70	4.50	4.35	5.73	5.58

The entire metal market seems to be very sensitive, and it is weaker all round. Consumers of copper are out of the market again. The American Smelting & Refining Company has reduced the price of lead 10 points. Pig tin is cheaper and there is no buying of spelter to amount to anything.

Copper.—Consumers of copper did not seem to consider the statistics of the Copper Producers' Association especially favorable, and they have withdrawn from the market, although most of those familiar with the situation had looked for a decided decrease in exports. Notwithstanding, however, that copper buying has ceased for the time being, inquiries that were made a week or more ago indicate that there are many consumers who are still somewhat short of stocks. The brass mills were about the last to come into the market during the buying movement, and it is fairly certain that some of them did not buy all they had intended to. The price of lake is being held firmly, but quotations of electrolytic are being shaded by some sellers. The outlook is not so very discouraging, however, as it is certain that deliveries during next month and in May and June will be good, as considerable of the copper bought a week or more ago will be put in the hands of purchasers during those months. At present lake is being sold for 13.75c. and electrolytic is 13.50c. The exports of copper are very light so far this month, as only 7853 tons have been shipped. There were heavy sales of copper in London to-day. They amounted to 500 tons of spot and 1000 tons of futures. London prices were spot £58 17s. 6d. and futures £59 17s. 6d.

Pig Tin.—There has been a decided decline in pig tin, following a slump in the London market last Monday, when the syndicate of French operators boosting prices there decided that it had enough and liquidated. The market went off £2 10s. and it immediately dropped here 50 points. The drop in the price in New York induced some consumers to buy, however, and 300 tons were sold on Monday. That was the only good buying day in the week. Pig tin closed 2s. 6d. lower again in London to-day, spot selling at £143 15s. and futures at £145 15s. The sales were 400 tons of spot and 600 tons of futures. The market was easy. In New York tin was sold at noon for 31.70c.

Tin Plates.—The tin plate situation has not changed and the building trades continue to be the principal consumers in this market. They are asking for large quantities and are pressing for deliveries, which are behind. The leading interest continues to quote $3.84 for 100-lb. coke plates. The price of Swansea plates has dropped 1½d., and to-day the Metal Exchange quotations were 13s. 1½d. It is certain, however that the mills there are full, and this reduction may not prevail for any length of time.

Lead.—Consumers of lead seem to have been alert to the situation, as their continued reluctance to buy has caused the American Smelting & Refining Company to reduce its price. This action was taken on Monday when the company announced that it would sell lead at 4.60c. in New York and 4.45c. in St. Louis. The outside interests immediately dropped their price from 4.52½c. to 4.50c., New York. It is apparent that large stocks are being held by outside sellers in anticipation of the spring trade, which has been delayed probably because consumers thought the price too high. They continue to demonstrate their ability to wait as the reduction caused no buying movement of any account. The situation of lead is more or less uncertain. It is apparent that many consumers are short of stocks and they must buy soon. Whether the sellers will offer any further inducements remains to be seen.

Spelter.—Spelter seems to be marking time. Sellers are of the opinion that it has reached its low level for the time being, and buyers are reluctant to come into the market, although they continue to make inquiries with a view to ascertain if they cannot get further reductions on the existing prices. It is apparent that there must be some buying shortly, and if the producers do not send prices up again some good trading might be looked for. This metal has been so sensitive of late that those who are in need of it have been buying only in small quantities, fearing that any amount of purchasing would be largely in the nature of a speculation. The price to-day in New York is 5.73c., and about 5.58c. in St. Louis. Some sellers are asking 5.75c., New York, but as there are no buyers it is not certain that they would not come down if a good sale was in sight.

Antimony.—The market is still dominated by Hungarian grades, which are freely offered at 7.50c. Hallett's is 8.25c. and Cookson's 8.50c.

Old Metals.—The market is quiet, with dealers' selling prices unchanged, as follows:

	Cents.
Copper, heavy cut and crucible	13.00 to 13.25
Copper, heavy and wire	12.50 to 12.75
Copper, light and bottoms	11.75 to 12.00
Brass, heavy	9.50 to 9.75
Brass, light	7.75 to 8.00
Heavy machine composition	11.75 to 12.00
Clean brass turnings	8.00 to 8.75
Composition turnings	10.25 to 10.50
Lead, heavy	4.40 to 4.50
Lead, tea	4.05 to 4.15
Zinc scrap	4.75 to 5.00

Lifting Magnets for Raising Sunken Cargoes.—An interesting use of lifting magnets was made recently at New Orleans, where a barge load of nails of the American Steel & Wire Company was sunk in the harbor. A derrick was employed carrying a magnet manufactured by the Cutler-Hammer Mfg. Company, Milwaukee, Wis. The magnet, which was 3½ ft. in diameter and weighed 3000 lb., was dropped into the water, and the current turned on. Three or four, and in some cases as many as five, kegs of nails were lifted at a time. The power of the magnet was such that kegs 3 ft. distant were drawn to it. Between 85 and 95 per cent. of the cargo was raised by the use of the magnet. This method was preferred to the use of a dredge, since by the latter the kegs would be broken open and considerable material lost. These magnets will also be used to raise a cargo of cotton ties near Natchez, Miss., and for the recovery of a lot of woven wire sunk in the river at Pittsburgh.

Crozer Furnace Makes a Record.—Crozer furnace No. 2, belonging to the Virginia Iron, Coal & Coke Company, and located at Roanoke, Va., made 194 tons of high grade foundry iron March 11. This is stated to be the best day's work for a stack of its size in Virginia and possibly the entire South. The best previous record on this blast was made March 10, when the output was 186 tons. The stack is 16 ft. 9 in. by 69 ft. high. The ores used are Virginia Mountain and limonite, yielding about 42 per cent. in the furnace, and requiring from 40 to 50 per cent. flux. Dolomite is used for fluxing, and Tom's Creek coke, from the company's ovens, for fuel. The blast is supplied by two 44 x 84 x 60 in. Allis-Chalmers blowing engines, run at 35 revolutions each. The output of the same furnace previous to this blast had been about 125 tons per day.

Boiler Explosions in 1909.—The total number of boiler explosions in the United States in 1909, as ascertained by the *Locomotive*, Hartford, Conn., was 550, the greatest number reported in any one year. The number was 470 in 1908, 471 in 1907, 431 in 1906 and 450 in 1905. The number of persons killed by boiler explosions in 1909 was 227, against 281 in 1908, 300 in 1907, 235 in 1906, 383 in 1905 and 220 in 1904. The number of persons injured (but surviving) by boiler explosions last year was 422, against 531 in 1908, 420 in 1907, 467 in 1906, 585 in 1905 and 394 in 1904. For the period between October 1, 1867, and January 1, 1910, the Hartford publication has recorded 10,601 boiler explosions, causing the death of 11,111 persons and injuries to 16,056 others.

The eleventh annual convention of the American Railway Engineering and Maintenance of Way Association is in session in Chicago this week. The convention opened on Tuesday and closes Thursday.

Buffalo Furnaces Fight New Coke Rate.

BUFFALO, N. Y., March 14, 1910.—On March 4 the railroads operating between the Connellsville coking district and Buffalo filed a schedule advancing the freight on coke 20 cents per net ton from the Connellsville field to Buffalo—namely, from $1.65 to $1.85, to take effect April 1. The pig iron manufacturers of the Buffalo district immediately brought action in the United States Circuit Court at Buffalo, asking for an injunction restraining the railroad companies from putting the increased rate in operation until the justness and legality of the advance shall have been passed upon by the Interstate Commerce Commission; alleging that the increased rate is unfair, unreasonable and discriminating, inasmuch as no increase is made in the freight rate on coke from the Connellsville district to any other or competing coke consuming pig iron producing point—Pittsburgh, Cleveland, Gary or Chicago. No attempt was made by the counsel for the railroads to dispute this contention; they basing their principal argument upon the point that the matter was wholly outside the jurisdiction of the court, the claim being made by them that the Interstate Commerce Commission held sole authority to interfere. After hearing the arguments of the complainants and defendants, Judge Hazel on Saturday last granted the injunction applied for, subject to the condition that the five Buffalo steel and iron companies who brought the complaint shall file a bond to indemnify the railroads in case the Interstate Commerce Commission should decide that the rate is just and reasonable, and further that they shall file their complaint with the commission within 10 days, and diligently proceed to a hearing thereon.

Steel and iron companies who would be affected by the increased rate, but who did not become parties to the complaint, are permitted to take advantage of the injunction provided they comply with the terms of the order. The Wickwire Steel Company, Lackawanna Steel Company, New York State Steel Company, Buffalo Union Furnace Company and Tonawanda Iron & Steel Company were the complainants in the action. The Buffalo & Susquehanna Iron Company was not a party to the complaint, as it has its own coking ovens in another district. The defendants were the New York Central, Pennsylvania, Erie, Buffalo, Rochester & Pittsburgh, Lake Shore & Michigan Southern, New York, Chicago & St. Louis, Pittsburgh & Lake Erie and Baltimore & Ohio railroads.

In view of the fact that this is the second increase in the freight rate on coke to Buffalo, a prior advance having been put into effect by the railroad companies without protest on the part of the Buffalo coke consumers—the complainants not knowing when these advances, arbitrarily put into effect, placing Buffalo at a great disadvantage, will cease—will seek to determine in the action before the Interstate Commerce Commission whether the railroad companies have the right to arbitrarily establish and announce an advance in rates on interstate business without first submitting the proposed increase to the commission with proof of necessity; as such discriminatory advances if continued, would neutralize Buffalo's natural advantage as an iron and steel producing center and correspondingly benefit its competitors. L.

A notable auction sale of manufacturing properties will take place at South Peabody, Mass., March 23 and 24, when J. E. Conant & Co., auctioneers of Lowell, Mass., will offer three manufacturing properties located on the Boston & Maine Railroad. The sale will include two parcels of real estate and 1800 lots of machinery, comprising the plant of the Corwin Mfg. Company, formerly the Vaughn Machinery Company. There are three groups of factory buildings on the property, including foundries and a machine shop, and these are shown in an extensive catalogue recently issued by J. E. Conant & Co., advertising the sale.

The Steel Corporation's Production in 1909.

The annual report of the United States Steel Corporation for the year ending December 31, 1909, gives the production of the several subsidiary properties as follows, compared with the results for the year 1908:

Products.	1909.	1908.
Iron ore mined:		
In Lake Superior ore region—	Gross tons.	Gross tons.
Marquette Range	899,002	830,087
Menominee Range	1,359,415	1,021,598
Gogebic Range	1,312,701	1,078,025
Vermillion Range	1,066,474	927,206
Mesaba Range	16,968,592	11,272,397
In Southern ore region—		
Tennessee Coal, Iron & Railroad Company's mines	1,824,863	1,533,402
Totals	23,431,047	16,662,715
Coke manufactured:		
Beehive ovens	11,896,211	7,591,062
By-product ovens	1,693,901	578,869
Totals	13,590,112	8,169,931
Coal mined, not including that used in making coke	3,089,021	3,008,810
Limestone quarried	3,496,071	2,186,007
Blast furnace production:		
Pig iron	11,436,570	6,810,831
Spiegel	80,942	74,716
Ferromanganese and silicon	100,838	48,861
Totals	11,618,350	6,934,408
Steel ingot production:		
Bessemer ingots	5,846,300	4,055,275
Open hearth ingots	7,508,889	3,783,438
Totals	13,355,189	7,838,713
Rolled and other finished steel products for sale:		
Steel rails	1,719,486	1,050,389
Blooms, billets, slabs, sheet and tin plate bars	675,614	551,106
Plates	729,790	312,470
Heavy structural shapes	658,516	313,733
Merchant steel, bars, hoops, bands, skelp, &c.	1,290,970	577,591
Tubing and pipes	1,013,071	654,428
Rods	139,149	93,406
Wire and products of wire	1,607,689	1,275,785
Sheets—Black, galvanized and tin plate	1,024,985	770,321
Finished structural work	530,766	403,832
Angle and splice bars and other rail joints	190,226	84,669
Spikes, bolts, nuts and rivets	72,076	40,252
Axles	68,366	24,057
Steel car wheels	67,985	7,223
Sundry steel and iron products	70,971	47,670
Totals	9,859,660	6,206,932
Spelter	27,853	28,057
Sulphate of iron	33,582	26,411
	Barrels.	Barrels.
Universal Portland cement	5,786,000	4,535,300

Allegheny Steel Company Improvements.—The Allegheny Steel Company, Pittsburgh, with mills at Brackenridge, Pa., is installing new furnaces, &c., in the building recently completed for making tubes, which will be ready for operation about May 1, when its capacity will be doubled. The company manufactures charcoal iron and steel boiler tubes from 1½ to 6 in., inclusive, and reports quite a demand for its specialty, Reliance charcoal iron locomotive boiler tubes. In a new building, 85 x 160 ft., fully served by electric traveling cranes, it is now making steel castings up to 25,000 lb. This department now has an additional 35-ton open hearth furnace, recently completed. In all the company has five open hearth furnaces with a daily capacity of 270 tons. Its new washer department is in an independent building, 40 x 250 ft., and is turning out about five tons of plate washers per day, up to 2½ in. in diameter. Vollkommer & Co., Pittsburgh, did some of the engineering work that figured in these improvements. The plate and sheet steel departments are being operated to capacity. E. M. S. Young is general sales manager, with offices at Brackenridge, Pa.

The Machinery Trade.

NEW YORK, March 16, 1910.

While business with machinery dealers has fallen off during the last two weeks, manufacturers of machine tools and general machinery are crowded with work. The slight let-up in the demand, if it does not last long, will, if anything, be welcomed by many manufacturers of machine tools who have been obliged to see former customers seek elsewhere for equipment or purchase second-hand machinery to supply their immediate wants, because the makers were unable to book orders for delivery within the required time. Most of the dealers are complacent over the situation, as during the last three months they have done an unusual business. Things are not at a standstill, by any means, and orders from the general manufacturing field are coming in in good quantities. Men who are familiar with the railroad situation are surprised over the fact that the railroads are not buying to any great extent, and it is generally declared that many of the roads must come into the market soon for machinery. The Pennsylvania Railroad has not bought equipment of late and the only roads having made any great purchases in this territory recently are the Norfolk & Western and the Baltimore & Ohio Railroad. While the greater part of the lists sent out by these two roads has been filled, there are still some machines to be bought. There is a good volume of inquiries and the demand for second-hand machinery has kept up well. The foundries that make a specialty of machinery castings are filled up with work and there is a heavy demand for foundry equipment, owing to the fact that many of the iron and steel machinery casting manufacturers are increasing the capacity of their works.

The Orson Automobile Company, New York, has been organized by 100 men interested in financial, railroad and industrial affairs to manufacture automobiles, first for themselves and later for the general trade. Horace M. Kilborn, vice-president National City Bank, is one of the chief factors of this novel enterprise, and those associated with him are all men of importance in the business world. The scheme originated, according to Mr. Kilborn, through an idea of a New York man to build an automobile for himself with the aid of a well-known engineer. He mentioned his plan to others and found them anxious to do the same thing. The company is now seeking a site for a plant and Mr. Kilborn states it will probably be located in Springfield, Mass. The initial plant will be made large enough to build 100 cars expeditiously, and it is highly probable that the company will continue to manufacture for the general trade.

The Whitehead & Hoag Company, Newark, N. J., manufacturer of badges, novelties, &c., has purchased a tract of land at Sussex avenue, First and Dickerson streets, Newark, on which a plant will be erected, after which the company's equipment in its present plant at Warren and Washington streets will be moved to the new building. The tract the company has purchased has a frontage of 260 ft. on Sussex avenue, 475 ft. on First street and 520 ft. on Dickerson street. It is understood that most of the property will be occupied by the buildings comprising the new plant, the plans for which are now being prepared. The company's machinery requirements have not been arranged for as yet.

The General Electric Company, Schenectady, N. Y., is planning to spend about $100,000 on a four-story and basement building on Boyd and Eighteenth avenue, Newark, N. J., which will be an extension to the existing plant. The building will be 80 x 145 ft. and will be devoted almost entirely to the manufacture of electric lamps. Machinery equipment such as is used in lamp making, consisting largely of automatic equipment for the metal parts, will be installed.

The W. M. Crane Company, 16 West Thirty-eighth street, New York, is erecting a factory for manufacturing gas ranges and stoves at Garfield street and Gates avenue, Jersey City, N. J. The building will be 300 x 600 ft., one story, of brick construction with concrete floor. Most of the equipment has been provided for, with the exception of the heating and power plants, which are yet to be decided upon. It is estimated that the power plant will be of 250 hp. capacity. About 400 men will be employed in the factory when it is completed.

Samuel Jones & Co., 7 Bridewell place, London, S. E., England, who, as reported in *The Iron Age* of February 10, intend to build a plant at Waverly, N. J., for the manufacture of gummed paper, have awarded a contract for the building to the Turner Construction Company, 11 Broadway, New York, and work on the proposed plant will be begun within the next 30 days. The main building will be 36 x 130 ft. and there will be a wing 34 x 60 ft. The entire structure will be five stories in hight. Howes & Morse, 19 West Thirty-eighth street, New York, are the architects, but the machinery details, it is thought, will be arranged by Samuel Jones & Co., who intend very shortly to open an office here for that purpose.

The Gillette Safety Razor Company, 18 Tremont street, Boston, Mass., is progressing with its plans for the erection of a plant at Evergreen and Frelinghuysen avenues, Newark, N. J., but the machinery details have not as yet been arranged beyond the fact that a power plant of 500 hp. will be installed. The first building to be erected will be 81 x 200 ft. in size and will be of saw tooth construction. Plans for this building have been prepared by Howes & Morse, 19 West Thirty-eighth street, New York, and the engineering details are being looked after by Leonard Waldo, 49 Wall street, New York. Judging from inquiries that have been placed in the trade, it is thought that arrangements for the machinery will be made before long.

The Gretsch Corporation, 104-114 South Fourth street, Brooklyn, N. Y., will probably require considerable special machinery and other equipment used in the manufacture of musical instruments. The company has awarded to the Turner Construction Company, 11 Broadway, New York, a contract for the erection of a six-story factory of reinforced concrete which is to be 83 x 120 ft.

William J. Bailey, manufacturer of tools, dies and light machinery, has moved his plant from 50 Columbia street, Newark, N. J., to 8 Johnson street, where he has taken about four times the amount of space he formerly occupied. Mr. Bailey, who has been compelled to enlarge his plant several times of late, will add additional machinery equipment.

Irving M. Colby, who operates a machine shop and foundry at Grandville, Ill., is making inquiries in this market for machine tools to include engine lathes, turret lathes, drill presses, press machines, milling machines and other equipment, with a view to enlarging the capacity of his plant.

The Aluminum Company of America has let contract to the Turner Construction Company, 11 Broadway, New York, for a two-story reinforced concrete factory building, with saw tooth roof, 132 x 200 ft., to be erected at Niagara Falls, N. Y. The headquarters of the Aluminum Company of America are at Pittsburgh, Pa.

The recently organized Boyd Steel Spring Company, 505-513 State street, Brooklyn, N. Y., has equipped an up to date plant for the manufacture of automobile and machinery springs. The officers of the company are Henry B. Boyd, president and treasurer; Archibald B. Boyd, vice-president, and Charles A. Cook, secretary and manager.

The Buffalo Cereal Company is receiving bids through the Alfred E. Baxter Engineering Company, Buffalo, N. Y., for a cereal mill 60 x 100 ft., four stories, and a grain elevator 40 x 100 ft., 100 ft. in hight, of reinforced concrete and steel, at Elk street and the Lake Shore & Michigan Southern Railroad, to replace mill recently destroyed by fire. Considerable elevating and milling machinery will be required.

Weaver & Wittle, manufacturers of gasoline engines, Lebanon, Pa., have arranged to erect a building 24 x 50 ft., to be used as a foundry.

Business Changes.

The Turner Construction Company, 11 Broadway, New York, has established a branch office at 312 Prudential Building, Buffalo, N. Y. James L. Biuff will continue as manager. H. E. Plumer is engineer and W. E. Lyle superintendent. Mr. Lyle has had charge of the construction work for the new plant of the Pierce-Arrow Motor Company at Buffalo.

The Carpenter-Kerlin Gear & Machine Company, 77 White street, New York, has been incorporated under the laws of the State of New York, with an authorized capital of $60,000. The company was organized several months ago to deal in gear cutters and kindred lines and to manufacture cut gears. The company has recently added to its line heavy duty punching and shearing equipment which is made by the Oeking Steel Works, Ltd., Dusseldorf, Germany.

Philadelphia Machinery Market.

PHILADELPHIA, PA., March 15, 1910.

Local business has been interfered with to some extent by the sympathetic strike of union labor in this city. That this has not been a general strike, as far as that term applies, is evidenced by the fact that employees in many diversified lines have steadily remained at work, and few plants in the iron, steel and machinery lines have been seriously inconvenienced. During the week gains were made by both sides; a number of employees in some of the larger industrial establishments were induced to go out, while in other instances employees who walked out early last week have returned to work. Many of the larger machine tool builders, the shipyards and general industrial plants continue in operation on the same basis as previous to the calling of the strike.

Machinery merchants report conditions during the week to have been rather quiet, local buyers are inclined to postpone purchases until the strike situation becomes clearer,

and orders taken have been largely of a miscellaneous character and mostly confined to single tool propositions. Customers outside this immediate vicinity show little hesitancy, however, in placing orders, although the volume of business has not been large, the tendency of buyers being, in many cases, to split up their orders among various concerns, so as to obtain the best delivery available. Reports received from tool and machinery builders in this territory indicate that a fair volume of business has been coming out; in many instances plants are engaged at full capacity and are working overtime in order to maintain promised deliveries. Difficulties in obtaining prompt shipments of raw materials are frequently noted, and in some cases result in deferred deliveries of equipment. Little fresh inquiry for tools and machinery has come from the railroads in this territory. Some fair business is in sight, however, but current orders have been small and unimportant.

The foreign demand continues inactive. That for tools of the standard types is practically at a standstill, although occasional inquiries and orders for equipment of a special nature are received by manufacturers in this territory. For power transmission equipment manufacturers report a fair volume of export business.

The second-hand machinery market shows a slight betterment. Purchasers experiencing difficulty in obtaining satisfactory deliveries on new equipment, are turning their attention to second-hand tools and, while the business transacted has not been particularly heavy, the outlook is believed to be more favorable. The demand for second-hand engines, boilers and general equipment still continues to drag, although manufacturers of new power equipment are receiving more inquiries and look forward to a better volume of business.

A number of local gray iron foundries are still affected by the sympathetic strike of the iron molders. In instances, however, employees have returned to work. Outside the city labor troubles have not interfered with foundry operations and many plants are well engaged. Steel casting plants are operating at full capacity and deliveries are generally delayed.

Estimates will be taken until March 23 on plans for a new passenger station to be built by the Philadelphia & Reading Railway at Ninth street and Columbia avenue, known as contract No. 15. The building will be of brick and concrete and is in accordance with the elevation of the company's railroad tracks in that section of the city. Elevators will be installed to convey passengers from the street level to the train floor.

Permits have been taken out by the William Steele & Sons Company for the erection of a three-story brick factory building, 64 x 350 ft., to be built for the Friedberger-Aaron Company, lace manufacturer, at Eighteenth and Courtland streets.

The American Steel Foundries is replacing its present gas producer equipment at its Thurlow, Chester, Pa., plant with a new and modern installation, to be furnished by R. D. Wood & Co. of this city. The new gas plant will provide sufficient extra gas to take care of three 25-ton open hearth furnaces.

Tht Kappler Fox Foundry Company, York and East Thompson streets, has had plans prepared by Peter Kuhn, architect, for a four-story addition to its warehouse. No equipment except elevators will be required.

Henry J. Blauvelt, architect and engineer, has awarded the contract for the erection of a large concrete coal pocket for the Walter T. Bradley Company, Ninth and Thompson streets, Philadelphia, to J. E. & A. L. Pennock, builders, with offices in the Land Title Building.

The Pennsylvania Salt Mfg. Company is building a one-story power house, 52 x 101 ft., on Delaware avenue, below Porter street. It is the intention of the company to transfer its present equipment to the new building on completion. No further purchases are contemplated at this time.

The Pennsylvania Railroad Company has placed orders with the New York Shipbuilding Company, Camden, N. J., for two 250-ft. standard steel car floats. Orders have also been placed with the William Cramp & Sons Ship & Engine Building Company of this city for four 145-ft. standard steel car floats, while the New York, Philadelphia & Norfolk Railroad Company has placed an order with the former named builder for a steel harbor barge.

The Baltimore Bridge Company, Baltimore, Md., has built an addition, 50 x 125 ft., to its plant, in which considerable machinery has been installed. This company's plant is running full time, its February output being above the average. Several large contracts are on its order books, which will keep it busy for some little time.

The Pennsylvania Shafting Company, Spring City, Pa., has recently increased its capital stock from $125,000 to $300,000, to provide for rebuilding and equipping a large addition to its plant, which work is now being proceeded with. Orders received during the last three months called for the largest tonnage ever booked during a corresponding period, and the plant is being operated at its utmost capacity to meet this demand, in which they are handicapped to some extent by delayed deliveries of raw materials.

The Royersford Foundry & Machine Company, Royersford, Pa., is receiving quite a good number of inquiries for its line of punches and shears. A No. 3 machine with a 26-in. throat has been recently sold to the Vanderstucken-Ewing Construction Company, Bethlehem, Pa., while one of the same type has been sold to F. L. Hughes & Co., Inc., Rochester, N. Y., and also to the Bronx Iron & Steel Company, New York. A No. 3A punch and shear has also been sold to a Brooklyn, N. Y., customer. The Royersford Company reports business in its power transmission equipment lines hardly up to the average, but it is very busy in that department getting its new Sells roller bearing, recently illustrated in *The Iron Age*, on the market.

The Birdsboro Steel Foundry & Machine Company, Birdsboro, Pa., is increasing the capacity of its steel foundry by the addition of an outside crane runway, 40 x 200 ft., for handling flasks and castings. It is also installing a 1300 cu. ft. air compressor to increase its cleaning facilities. One of its open hearth furnaces is being rebuilt and increased in capacity, improvements to core ovens and sand handling facilities are also being added, all of which will increase the output of the plant from 10 to 20 per cent. Heavy shipments have recently been made from its machine shops, consisting principally of electrically driven pumps and blast furnace work for different companies, including the Reading Iron Company, Warwick Iron & Steel Company and for the second blast furnace building for Worth Brothers, Coatesville, Pa., for which the Birdsboro Company has a large contract.

The Board of Directors of the Lehigh Valley Transit Company, Allentown, Pa., has made arrangements for a stockholders' meeting on April 21 to approve a proposed increase of indebtedness for further financing the company. A portion of the increase will, it is proposed, be used for future improvement purposes, both in the way of equipment and general development.

New England Machinery Market.

BOSTON, MASS., March 15, 1910.

The tone of the market continues to improve. The week has been a good one with the dealers, and the machine tool builders as a general rule make favorable reports of business. Manufacturers are beginning to realize from practical results how much greater their producing power has become in the last three years. The outfit of machine tools runs as high as 40 per cent. above that of 1906-7. One large concern has found this to be its actual gain. Combining this growth with capacity of the new companies which have entered the field with machinery that competes with established lines of metal working tools brings the total machine tool production to a high figure. It has been estimated that more machine tools are actually in process of manufacture in the United States to-day than ever before. When the high tension of 1907 is reached the percentage of increase will be even more pronounced.

The condition of the wire business affords an excellent commentary on the general situation in metal lines. Earlier in the year a falling off in orders was experienced, not affecting output to any extent, because of business already booked, but indicating that the market had lost its snap. This continued for some weeks, but within the fortnight a decided improvement has been experienced. Many wire lines, however, were not affected by the slight depression. Electrical goods, for example, remained in persistent demand, beyond the capacity of the plants. The Worcester works of the American Steel & Wire Company cannot take care of current business in these and other specialties and are well behind on deliveries, but, on the other hand, poultry netting had a setback, jobbers ceasing buying for a time, though this market has now resumed its normal tone. The independent plants of Worcester are all running at full blast, including the Morgan Spring Company, Wright Wire Company and Spencer Wire Company, specialties having a steady market, but in some cases lacking in the eagerness of buying which had characterized December. Prices of tonnage products have not recovered, but there is an expectation that the next 30 days will see an improvement. Manufacturers of wire nails are now rapidly disposing of their product. A few weeks ago even the reduction in prices failed to move large accumulations of stocks, but this suddenly changed, undoubtedly owing to the resumption of building activity.

The Baird Machine Company, Waterbury, Conn., manufacturer of automatic machinery and tumbling barrels, has increased its capital stock from $50,000 to $100,000. The company has purchased a large tract of land at Thomaston, Conn., on the line of the Naugatuck Division of the New York, New Haven & Hartford Railroad, and will erect a new plant on the premises in the near future, the purpose of the new capital being to provide funds for a large extension of the business, the development of which has already been a rapid one. Plans for the new shops have not been com-

pleted, but it is known that manufacturing facilities will be at least doubled. The present works will be abandoned when the Thomaston shops are ready for occupancy.

The Standard Gauge Mfg. Company, Foxboro, Mass., has increased its capital by an issue of $300,000, the funds to be devoted to taking up floating indebtedness incurred for improvements made during 1909, and to the continuation of the development of manufacturing facilities and new products during the current year. The Industrial Instrument Company, Waterbury, Conn., the holding corporation, has made a proportionate stock increase.

Manufacturing enterprises outside of metal lines, just announced, include the following: Neild Mfg. Company, New Bedford, Mass., textiles, new mill, complete, for a business capitalized at $800,000; Sprague Mfg. Company, Orange, Mass., clothing, addition 30 x 105 ft., two stories; a New Bedford Corporation, headed by James Sinclair, Wampanoag Mills, mill to contain 50,000 spindles.

A large percentage of the New England members are making arrangements to be present at the spring meeting of the National Machine Tool Builders' Association, to be held at Rochester, N. Y., May 24 and 25.

William H. Cadwell, New Britain, Conn., has made plans for the erection of an industrial building, which will be occupied in part by the Beaton & Bradley Company. Work will begin when the balance of the space has been taken up.

The business of Hemming Bros., New Haven, Conn., manufacturers under the Joy patents of automatic grinding, glazing and polishing machinery, have incorporated as the Hemming Bros. Company. O. L. Hemming is the president; R. B. Hemming, vice-president and treasurer, and Carl H. Hemming, secretary.

The International Silver Company, Meriden, Conn., will erect an addition to its Barbour Silver Company factory in that city, of brick, three stories and basement, 40 x 60 ft., with an ell 40 x 112 ft.

The Boston Automobile Show in Mechanics' Building last week demonstrated that popular interest in the motor car has in no way abated, and is rather on the gain than otherwise. The large exhibit of trucks and other commercial vehicles attracted much attention, and argued for the rapid development of this branch of the industry. No great amount of space was devoted to machinery or tools. The show, coupled with the announcement of the purchase of the Everett-Metzger-Flanders Automobile Company, Detroit, by the Studebakers of South Bend, Ind., aroused much comment on the probable limit of production of cars in America. Figures announced for 1910 are startling, more so even than those given out a year ago for 1909, and the old cry of probable overproduction in the near future has been revived. Machinery builders and others who serve the automobile industry do not anticipate any falling off in this branch of their market this season, and expect that the motor truck will be a much more important factor than ever before.

The foundry of the Portland Specialty Company, Portland, Conn., was burned March 11, with loss of $5000.

The New York, New Haven & Hartford Railroad is seeking permission of the Massachusetts Legislature and the city of Boston for the construction of a tunnel connecting the North and South stations, Boston, an undertaking which would involve the expenditure of some millions of dollars. The Boston & Maine enters the city at the North Station, the New York, New Haven & Hartford and Boston & Albany at the South Station. The tunnel would greatly expedite the handling of freight and also passenger traffic. Legal stumbling blocks stand in the way, but it is believed that some means will be found to overcome the obstacles.

The General Electric Company will double its power plant at Pittsfield, Mass., this season.

The New Haven Clock Company, New Haven, Conn., will erect a new factory building, 33 x 61 ft., five stories, with wing 40 x 62 ft., four stories.

The Seymour Iron Foundry, Seymour, Conn., will build an addition to its foundry.

The Whitin Machine Works, Whitinsville, Mass., has begun the erection of an addition to its blacksmith shop, 87 x 100 ft., and will build an addition to the foundry, 100 x 400 ft.

The large repair shops of the Boston Elevated Railway Company, Boston, Mass., were burned March 12, with a loss of $450,000. These are the principal shops of the very large street railway system of Boston and its suburbs, and large purchases of machine tools and other equipment should be necessary in order to provide facilities for repair work.

Plans for the new factory of the C. G. Garrigus Machine Company, Bristol, Conn., call for a building 45 x 66 ft., three stories.

The Standard Card Clothing Company, of which Victor J. Bissonnette is the principal owner, has leased the Chandler box factory at Stafford Springs, Conn., and will equip it for manufacturing.

The French Mfg. Company, Waterbury, Conn., manufacturer of small seamless brass and copper tubing, has increased its capital stock from $25,000 to $50,000. Future developments of the business have not been decided.

Chicago Machinery Market.

CHICAGO, ILL., March 14, 1910.

A streak of lean and a streak of fat would describe in a phrase the condition of the Chicago machinery market since the first of the year. For a week or two business will be very good and all the houses will receive a good run of orders, and then will follow a quiet period, to be succeeded again by an active run of trade. For the past week or 10 days the dealers have been going through one of the lean streaks. An encouraging feature of the situation, however, is that each lean period is a little better than the one before. Although the market is going through one of the periodical reactions, there is a fair volume of business, and it is also characteristic that the dull periods do not last as long as they did last year. There are indications that another streak of fat is due in the near future. One disappointing feature of the trade is that the Western railroads which have lists pending in the market are very slow in closing business on these lists. When the largest one was sent out more than two months ago the machinery houses were asked for immediate bids, and were given to understand that those who could make the earliest deliveries would be favored in placing the business, but apparently the enthusiasm of the purchasing departments has been chilled, possibly by the fact that the great improvements that have been made in machine tools in the past 20 or 30 years have made it necessary for the manufacturers to ask higher prices. There is no doubt, however, that some of this business will be placed in the near future, and it will help out the order books of the machinery houses. The equipment of the Western roads is getting in such condition that it is exceptional nowadays for a train to be on time. Locomotives and cars are getting in a condition that is almost hopeless, owing to the lack of shop facilities for repair work and renewals.

The H. A. Stocker Machinery Company, Chicago, has recently sold a number of heavy machine tools. One recent order was for a 10 x 8 x 24 ft. Deitrich & Harvey open side planer with extension housings, along with an 84 in. x 28 ft. lathe, these going to the Buffalo Machinery & Foundry Company, Buffalo, N. Y. Another order taken recently was for a 42-in. King boring and turning mill, and also one for a large punch and shear with 36-in. throat for punching 1½-in. holes in 1-in. plate. This company also sold recently a 30-ton Morgan electric traveling crane.

The A. Bauer Construction Company, Huron and Franklin streets, Chicago, is erecting a seven-story building of mill construction which will be equipped with fireproof vaults, large freight elevators and steam heat.

The Reynolds Machine Company, Moline, Ill., which for some time has been having its machines built in a local shop, is considering moving further East to establish its business in a more central location. It is the intention of the company to do its own manufacturing after removing from its present location.

The Continental Bolt & Iron Works, Chicago, contemplates installing a large number of electric motors. The full list has not yet been issued.

The city of Hancock, Mich., has let contract to the Gould Mfg. Company through its Chicago office for a new pumping unit.

The United Pump & Power Company, Clyde, Ill., will have its plans prepared in the near future for an addition to its plant.

A motor driven pump for deep well service is to be purchased on or after March 28 by the authorities at Summit, Ill.

A mechanical filtration plant may be installed this year at Greencastle, Ind.

Plans are being drawn for a factory building to be occupied by James C. Curtis & Co., Chicago, the equipment of which is to include a power plant of about 250 to 300 hp.

The Henders Bros. Sand Company, Ottawa, Ill., has installed a plant for the production of sand intended especially for use in steel foundries.

Bids are being received by the city of Galesburg, Ill., until March 21 for power plant machinery, consisting of two reciprocating engines, a steam turbine unit, an alternating current dynamo, switchboard and auxiliaries. Full particulars can be obtained at the office of the city clerk.

The Egyptian Mfg. Company, Robinson, Ill., will install power, woodworking and other machinery in a new factory to be completed this spring.

The National Tire Setter Company, Keokuk, Iowa, manufacturer of hydraulic machinery, is preparing to move its business to Springfield, Ill., where it will erect a new factory building.

The American Motor Car Company, Indianapolis, Ind., has signed a contract with the Commercial Club and Retail Merchants of Lafayette, Ind., for the removal of its factory to the latter city.

The Commonwealth Edison Company, Chicago, has purchased 109 acres of land on the west side of the north branch of the Chicago River, between Roscoe street on the

south and Addison street on the north, on which it will immediately begin the construction of a new turbine generating electric light and power plant, the total expenditure when the plant is completed being estimated at $15,000,000 to $20,000,000.

The More-Jones Brass & Metal Company, St. Louis, Mo., has plans prepared for a one-story foundry building to be erected at a cost of $30,000, which will double the present capacity of the company. The structure is to be of reinforced concrete and will occupy ground adjoining the present foundry of the company at 3138 Broadway. The company manufactures machine parts and articles of brass and white metal. It is expected that the new plant will be ready for occupancy in about three months.

The World C. & C. R. Systems Company, Inc., Kirksville, Mo., manufacturer of cash registers, advises that it has a plant containing 15,000 ft. of floor space fully equipped and in operation. The building now occupied by the company, however, has only been rented for a short time, it being the intention of the company to erect a factory in the near future, at which time motors and other machinery for the various departments will be installed.

The Chicago Iron Foundry Company, Chicago, has been incorporated by William W. Scannell, Lawrence Walsh and Nona E. Scannell, with capital stock of $5000.

The Haines Company, Chicago, has been incorporated with capital stock of $12,000 to do a general sheet metal manufacturing business. The incorporators are William B. Moore, Richard J. Ross and E. D. Markham.

Cincinnati Machinery Market.

CINCINNATI, OHIO, March 15, 1910.

In machinery and machine tool products the week has been uneventful. The mails of Monday morning brought very encouraging messages to a number of the large tool manufacturers and some orders. The tone of the market is quiet, but all concerns are working full time and mainly with full forces on orders for future delivery ranging from 30 days to six months. Lathe manufacturers are expecting definite information in a few days from some good sized lists which have been held up for several months. The automobile manufacturers continue to be the best patrons of the lathe producers, and it is estimated that from 50 to 60 per cent. of the lathe business now is coming from the makers of the horseless carriages. Manufacturers of high speed upright drills have enjoyed an excellent business since the first of the year, and there have been some radials sold also.

The officials of the Cincinnati-Bickford Tool Company are very busy with the details of the new Oakley plant, and from the time that ground is broken, which will be in a few days, the actual work of construction will proceed uninterruptedly. It is hoped to have the new plant in operation by September or October. The new factory will be located between the plants of the Cincinnati Planer Company and the Cincinnati Milling Machine Company, and, like those concerns, will be supplied with power from the central station known as the Factory Power Company. Ample provision is to be made in the new plant for future expansion.

Officials of the Cincinnati Grinder Company are much encouraged over the outlook for the manufacture of its new tool, a No. 2 universal grinder, and will select the site of the new factory this week in order that actual operations may be commenced at the earliest possible moment.

It is estimated that the new building now under construction for the Swink Printing Press Company of Delphos, Ohio, will be finished and ready for occupancy by June 1. The building is of brick and mill construction, 60 x 280 ft., two stories, and will be a very substantial and handsome addition to the manufacturing interests of Delphos. Credit for the new enterprise is due the Delphos Mfg. Company, which recently acquired a controlling interest in the business. For the equipment of the new plant considerable machinery will be required, and General Manager H. L. Leilich of the Delphos Mfg. Company has furnished the following list of tools which it expects to purchase in the near future: One 48-in. milling machine, three-head; one 24-in. cutter grinder, one keyseater, one 14 x 60 in. plain grinder, one disk grinder, one turret lathe, bar outfit only; one cam cutting machine, two chucking lathes, Nos. 3½ and 4; one 24-in. lathe, patent head; one 30-in. vertical turret lathe, one 5-ft. radial drill, one No. 5 milling machine, plain; one No. 2 milling machine, universal; one 4-in. circular cutting-off saw, two 20-in. drill presses, one 24-in. drill press, one gear shaper, one No. 3 or 4 gang drill, two buffing stands, four emery wheel stands, one band saw, one pattern lathe, one woodworker.

Weather conditions being satisfactory, work is to be resumed at once on the new building under construction at the corner of Perry and Third streets, Defiance, Ohio, by the Defiance Machine Works. Work on this building, a two-story structure, was begun last fall, but was stopped because of inclement weather.

Machinery is being installed in the new addition to the plant of the Galion Iron Works, Galion, Ohio. Provision is made for an electric traveling crane to be put in later. The new addition will add greatly to the capacity of the plant, which is reported to be crowded with orders.

The Ohio Metallic Specialty Company, recently incorporated at Columbus, Ohio, with a capital of $50,000, has purchased a factory site in Bell street, near Broad, and will make a varied assortment of sheet metal specialties, including office furniture, grate fronts, exterior rough boxes, mantels, doors and windows. The officers are men of experience in sheet metal construction work. Peter Ebner, for several years with F. O. Schoedinger, is president, and H. C. Hames, formerly with the Keighley Mfg. Company, Pittsburgh, is secretary.

With the recently placed order of the Cincinnati, Hamilton & Dayton Railroad for 500 steel cars, the Ralston Steel Car Company, Columbus, Ohio, is booked ahead solidly for several months, and every department of the plant is being operated to capacity.

Plans and specifications have been prepared for the enlargement of the car barns and the erection of machine shops for the Terre Haute, Indianapolis & Eastern Railroad Company at Greenfield, Ind. It is estimated that $18,000 will be spent by the railroad on these improvements. The machine shops are to be removed from Richmond, Ind.

Cleveland Machinery Market.

CLEVELAND, OHIO, March 15, 1910.

The local machine tool market is rather quiet. The month started out fairly well, but there are fewer good inquiries than there were a week or two ago, and the immediate outlook is not so promising as some of the dealers have been predicting. A fair volume of new inquiries have come out during the week, but they have mostly been for one or two tools. No lists of any size have developed. Some of the larger estimate requests that have come into the market recently have not yet resulted in the placing of orders, but a considerable portion of this business is expected to be booked shortly. Very little business is being received at present from the automobile trade, and this accounts largely for the inactivity of the market, although makers of automobile parts are rushed filling orders taken some time ago. Railroad orders are few and principally for single tools. In power equipment actual business reported is light, but inquiries are fairly good, so that the future is regarded as encouraging. While the market in general does not show as much life as desired, the prospects are fairly satisfactory. Many manufacturing plants in metal working lines in this territory are planning additions as soon as weather conditions become more favorable, and these extensions are expected to result in a demand for considerable additional machine tool equipment. More new manufacturing plants are being projected than for some time, but in most cases these are not far enough along to bring out inquiries for the machinery equipment.

The general manufacturing situation continues satisfactory. Some manufacturers report an improvement in orders and there is less pessimistic talk than a few weeks ago. Plants as a rule are being run at their full capacity.

The supply of second-hand tools is larger than it has been for some time, owing to the fact that the equipment of several small plants has been placed on the market. The demand continues fair.

The Wright Wrench Company, Canton, Ohio, has let contracts and broken ground for the new factory it will erect in that city, larger quarters being necessary because of the company's rapidly increasing business. The new plant will be located in South Canton on two lines of railroad, the site covering 3 acres. Two buildings will be erected, one of brick and one of steel construction, which together will have a floor space of over 13,000 sq. ft. Considerable new machinery will be installed, much of it especially designed for the company. With its increased capacity the company will employ more than twice as many men as at present and will be able to turn out 2000 wrenches per day. The new plant will be ready for occupancy about May 1, and it is stated that it will be one of the most complete of the kind in the country.

The Waterville Tractor Company, Waterville, Ohio, has been incorporated with a capital stock of $50,000, and will establish a plant for the manufacture of both heavy and light auto trucks. The incorporators are W. W. Farnsworth, D. Sheldon, A. E. Zock, Charles L. Graff, W. H. Ostrander and J. A. Fowler.

A large rubber plant will be established in Toledo, Ohio, in a short time if the plans of the promoters are carried out. The concern will be known as the Kelly-Toledo Tire & Rubber Company, with $375,000 capital stock. Of the $200,000 to be required at once it is claimed that nearly all has been subscribed. One half of this will be furnished by citizens of Toledo and the remainder by Charles F. U. Kelly, who will be manager of the company, and a number of associates.

The company will manufacture tires for automobiles, bicycles, trucks, &c.

It is announced from Toledo, Ohio, that the Toledo Machine & Tool Company has purchased a building site adjoining its present plant and will erect a large addition, 100 x 425 ft., six stories. It is expected that work on the addition will be started in a short time.

Tht Toledo Railway & Light Company, Toledo, Ohio, is planning to enlarge its power plant capacity, and is in the market for a turbine unit of about 5000 kw.

The Herr Engine Company, Portsmouth, Ohio, is in the market for a milling machine and a multiple spindle and a radial drill.

The Warren Mfg. Company, Toledo, Ohio, is planning to add to its present lines the manufacture of sliding gear transmissions for automobiles, and will probably be in the market for some additional machine tool equipment.

The Domestic Heater Company, Toledo, Ohio, has been incorporated with $20,000 capital stock to manufacture a new heater for residences and other buildings, the invention of W. M. Heckert. It is expected that a plant will be established for the manufacture of the heater.

The Minerva Hardware Mfg. Company, Minerva, Ohio, has been incorporated with an authorized capital of $20,000 by W. R. Kurtz, F. D. Shaw, J. A. Gunder, O. M. Sala and C. W. Foreman.

The Cleveland Aeroplane Company, Cleveland, has been incorporated with $10,000 capital stock by Sterling Parks and others. The company announces its intention to establish a plant for the manufacture of airships.

The Adams Brothers Company, Findley, Ohio, intend to add the manufacture of motor trucks to its present machine shop work, and is expected to be in the market for some additional machine tool equipment.

The Salem Iron Works, Leetonia, Ohio, has an inquiry out for a lathe, radial drill and two pipe machines.

The Cyclone Drill Company, Orrville, Ohio, is in the market for a small radial and an upright drill.

It is reported from Lorain, Ohio, that the National Steel Products Company, which recently established a plant in that city for the manufacture of spark plugs for automobiles, has received an attractive offer from Sebring, Ohio, to move its plant to that city.

The W. H. Mullins Company, Salem, Ohio, which has been considering a proposition to remove its plant to Sandusky, Ohio, has decided to remain in Salem.

Milwaukee Machinery Market.

MILWAUKEE, WIS., March 14, 1910.

The principal support given to the machinery market of late, aside from motor vehicle builders, has come from the general manufacturing industries, the requirements of which cover a great variety of service. For the present the needs of iron and steel mills, foundries and metal working plants seem to be pretty well provided for, although there is a steady run of buying of single machines which has not varied a great deal for some months past. Prices hold firm, with advancing tendency.

By a singular coincidence the writer recently had, within two hours of one another, conversations with an estimator for one of the leading Eastern tool plants and the sales agent of a prominent Western builder of general industrial machinery, in which the same point was very forcibly brought out by both, namely: that the demand is again running largely in the direction of special equipment as distinguished from machines of standard design. Since early in the fall manufacturers of machinery of all kinds have as a rule been turning out more standard apparatus than at any time within recent years, largely for the reason that both prices and terms of delivery were usually a particular object to the purchaser, and many manufacturers have flattered themselves that this condition would continue for some time to come; but the disposition to use special machinery seems to be again uppermost. The effect of the tendency will probably be, as it always has been heretofore, to complicate shop work, delay fulfillment of orders and reduce the net profits of manufacturers while increasing the cost to the buyer. It is an extravagance on the part of purchasers which there ought to be some concerted effort to oppose by a revelation of the waste involved, for in most cases a standard machine will perform the required service just as well as another that embodies some special idea of a shop superintendent or foreman, and it means actual saving in expense for all concerned.

Allusion has heretofore been made in this paper to the fact that abnormal activity has developed in the demand for machinery used in construction work, particularly rock crushers, concrete mixers, derricks and hoists. Representatives of the first named industry are practically unanimous in stating that their plants have all the business that can be handled at present, and three of the largest concerns in that line are now preparing to greatly enlarge their facilities. In at least two of the cases mentioned these will be practically doubled.

Machinery and appliances of all kinds for the production and use of compressed air also sell to excellent advantage, and even during the recent lull in buying the demand for such apparatus continued to increase. To a large extent this results from improvements being made in the equipment of rock quarries, stone cutting and finishing plants, mines and tunneling operations, and the extensive developments inaugurated of late in field work of every description must inevitably carry the use of pneumatic tools to a still higher level. It will be at once recognized by those who are conversant with general industrial conditions that such a demand is one of the best possible auguries of the future, for the extensive use of compressed air in pioneering and construction work has always been the forerunner of important industrial operations. In foundry and machine shop service the introduction of pneumatic appliances is also proceeding apace, except for purposes where sustained pressure is required; here hydraulic apparatus is crowding out compressed air.

Foreign trade has been very good lately and orders from the Orient are especially numerous compared with the average of previous years. The most satisfactory business is, however, being done with the other countries of this hemisphere. Manufacturers of the Northwest are shipping quite largely on direct contracts from Canada, Mexico, Cuba, Panama, Porto Rico, Brazil, Argentine Republic, Chili and Peru, the volume of sales to each being about in the order given; and considerable material is also being taken by agencies in New York, New Orleans and other coast cities for reshipment in part cargoes to all of the countries lying south, as well as South Africa. In some instances Wisconsin firms are also competing in European countries with British and German manufacturers on heavy machinery in which the trade has of recent years been given over almost entirely to such builders, sales being made purely on the basis of demonstrated operating economy. Exceptionally good prices have also been obtained. Otherwise there would be no object in selling at a distance with the domestic demand strong. As an illustration of the present high efficiency of American built machinery and the acknowledgment of that fact abroad, this condition is not without significance.

Contracts are being let for the construction of a large foundry building at the works of the Milwaukee Malleable & Gray Iron Company, in Layton Park, a suburb of Milwaukee. This will be a steel and concrete structure, 80 x 600 ft. The necessary equipment is understood to have been already arranged for, although some purchases may yet be made.

The Manistee Iron Works Company, Manistee, Mich., is installing boiler shop equipment in one of its present buildings and will build what is known as the Butman type of water tube boiler for power plant service.

Bids will be taken up to April 15 on equipment for the new factory of the Eau Claire Trunk Company, Eau Claire, Wis., including boilers and machinery for the generation and transmission of power, as recently outlined in *The Iron Age*.

Five carloads of machinery were recently shipped to Odessa, Russia, by the J. I. Case Threshing Machine Company, Racine, Wis.

It is reliably stated that the International Harvester Company, whose Milwaukee works are principally devoted to the manufacture of gasoline engines, turned out 22,000 of these machints last year, and is preparing to produce 30,000 or more in 1910.

The Racine Foundry Company, Racine, Wis., whose plans for a new foundry have been heretofore mentioned in *The Iron Age*, is preparing to proceed with the erection of the necessary buildings. A general line of castings for machinery and other purposes, including high grade work for automobile parts, will be the product of the plant.

The Northern Machine & Repair Works, Wausau, Wis., is putting on the market a small circular cutoff saw intended to take the place of a hack saw and for other service. The business of this concern has been increasing rapidly, and further extension of its plant will probably result in the near future.

The plans of the Universal Portland Cement Company, Chicago, for erecting a plant at Duluth or Superior, Wis., to utilize the slag from the works of the Minnesota Steel Company, are reported to be coming to a head, although local manufacturers of cement making machinery have not yet been called upon to estimate on equipment.

The Wisconsin Composite Brick Company, Milwaukee, has its new plant in operation. This includes gas producers, steel pressure cylinders, tube mill, presses, two 125-hp. boilers and a Filer & Stowell engine. It is very likely that the works will be doubled within a year, as a large demand for their product has developed from the start.

The Stevens Point Foundry & Machine Company, Stevens Point, Wis., is reported to have been awarded the contract to produce all of the castings needed for the coming year, about 100 tons monthly, on the Chicago division of the Soo Railroad. Thirty molders are now employed at the plant.

Plans for enlarging the plant of the Beaver Dam Foundry

Company, Beaver Dam, Wis., which recently resumed operations under a new management, are now being considered.

The Globe Iron Works, Menominee, Mich., has provided funds for the enlargement of its working capital and will make important improvements in the plant. The details of the proposed extensions have not been fully determined upon.

A large pump built by the Fred M. Prescott Steam Pump Company, West Allis, Wis., is being installed on the sixth level of the Superior and Boston mine at Globe, Ariz.

From Janesville, Wis., it is reported that the Monitor Auto Company of Chicago will remove to that city if a certain amount of stock is subscribed for by local capitalists. Temporary quarters are already being arranged for in anticipation of the event.

The Twin City Iron Works, Hurley, Wis., is said to contemplate establishing a branch shop in Iron River, Mich.

The Interstate Light & Power Company, of which A. O. Fox, Madison, Wis., is president, has nearly completed its new engine-driven power plant at Galena, Ill., from which electric current will be transmitted to Platteville and neighboring towns for the operation of the mines and reduction works. It is reliably stated that another generating unit will be added to the system by the end of the present year. Transmission lines are now being run and substations installed for the conversion of the power from high tension to commercial voltage.

From Superior, Wis., it is reported that the workmen at the plant of the United States Cast Iron Pipe Foundry Company in that city have suspended operations pending an adjustment of disputed terms of employment.

The Falls Machine Company, Sheboygan Falls, Wis., has not yet completed the buying of new equipment made necessary by the addition to its line of manufacture, as reported in *The Iron Age* recently.

The Waukesha Motor Company, Waukesha, Wis., which only lately completed a plant for the production of automobile engines, has been compelled to operate with full night shifts. At the present rate additional buildings will be necessitated shortly.

The commercial interests of Superior, Wis., have succeeded in interesting other manufacturers in the advantages of that city as a location for plants, including a tack factory and a stove works, the present situation of which is Pittsburgh, Pa.

The Beaver Dam Cement Works have been incorporated at Beaver Dam, Wis., and will install a plant for the manufacture of cement products used in building.

A boiler of about 125 hp., with engine and possibly electrical machinery, will be purchased about April 1 by the Charles H. Stehling Company, Milwaukee, for its new engineering establishment.

The authorities at Oconomowoc, Wis., have decided upon improvements in the city's pumping plant to match the recent enlargement of the electric generating station.

The Dillingham Mfg. Company, Sheboygan, Wis., will build a branch factory at Tampa, Fla., or in that vicinity, equipped with power and woodworking machinery.

A new air compressor is to be put in operation by the Calvert Mining Company at Benton, Wis., together with drills and other apparatus.

The Schaefer Company, Berlin, Wis., will put in an automobile part repair shop as an addition to its present plant. The manufacture of auto trucks on an extensive scale may be undertaken.

Hydraulic turbines with a capacity of 1800 hp. are being installed in the new power plant of the Kimberley-Clark Company, at Appleton, Wis. They will operate under a head of 15 ft. and drive dynamos for the generation of electric current to be used in the company's several plants.

Plans are being prepared for a new factory to be erected in a suburb of this city by the North Milwaukee Table Company. The equipment details remain to be decided upon.

The largest shipper of iron ore from the Gogebic range during the past year was the Newport Mining Company, owned by the Schleisinger interests of Milwaukee, nearly 900,000 tons having been sent down the lakes. During the present season, due to improvements in the underground equipment and the handling plant at the surface, these figures will probably be bettered.

D. P. Davies, assistant manager and engineer of the gas engine department of Allis-Chalmers Company, West Allis, will take a similar position with the J. I. Case Company, Racine, whose production of gasoline engines is to be enlarged.

Plans are being drawn for a three-story factory, 50 x 125 ft., to be erected by the Racine Iron & Wire Works, Racine, Wis. Motor drive will be introduced.

The Modern Steel Construction Company, Waukesha, Wis., has contract for the work on a second addition to be erected by the Porcelain Enameling Association of America at its plant in Sheboygan, Wis. No order covering equipment has as yet been placed.

The Wisconsin Specialty Company, Milwaukee, contemplates erecting a factory at some one of the smaller cities of the State, probably Sheboygan. No definite determination in relation to this has, however, thus far been reached.

A pumping plant will be built at Alma, Wis., and a complete system of water works installed before autumn if plans now under consideration are carried through.

The D. J. Murray Mfg. Company, Wausau, Wis., will install a sawmill, with power and cutting machinery, for the Robbins-Johnson Lumber Company, at Rhinelander, Wis.

The Roberts-Kingston Company, Duluth, Minn., has placed a contract with the Bucyrus Company, South Milwaukee, for one of its largest steam shovels, to be used in work on the iron ranges.

W. J. Raeuber, Manitowoc, Wis., has been entrusted with the preparation of plans for a new foundry building at Two Rivers, Wis., in which the usual equipment for gray iron castings, including a traveling crane, will be installed.

Two large boilers are to be purchased next month for the county buildings at Sparta, Wis., as a part of the equipment outlined in *The Iron Age* some months ago. Chandler & Park, Racine, Wis., are in charge of the plans.

The plant of the Milwaukee Stamping Works, West Allis, Wis., which recently burned, will be rebuilt on the same site for considerably larger capacity. New machinery will be needed throughout.

The Fairbanks-Morse Mfg. Company, Beloit, Wis., has taken an order from the Silver Island Coalition Company, Salt Lake City, Iowa, for an air compressor, drills, gas engine and other equipment to be used in mining operations.

The Janesville Granite Brick & Stone Company, Janesville, Wis., is preparing to remove its plant to Oklahoma City, Okla., and remodel it along the latest and most improved lines. The company when established in its new location will be known as the Oklahoma Granite Brick Company.

Pittsburgh Machinery Market.

PITTSBURGH, PA., March 15, 1910.

Manufacturers and dealers in machine tools have found March trade rather better than that of February, although it is not yet as active as it was shortly after the first of the year. Equipment for foundries and fabricating plants sells to better advantage, and the most satisfactory demand exists for general industrial machinery, including power units, motors, belting, shafting, &c.

A nice line of business is beginning to open up from structural iron and steel plants, bridge and dock builders and construction firms generally. Many of the larger works are either being extended or rearranged for larger capacity, and contractors who have not heretofore maintained independent shops are largely putting in their own equipment, as they feel that in view of the enormous quantity of work now in sight throughout the United States, Canada and Mexico it will be dangerous for them to depend too much upon others for fabricated material, particularly when anything special has to be done to it. Tools for field work, made as heavy, *i. e.*, for as large work, as the necessity of transporting them from one place to another will permit, will also be more extensively required this season, and manufacturers of such apparatus are already rushed with orders.

Inquiries from the iron ranges at the head of the lakes have been quite plentiful of late, and contracts for a great variety of equipment are being placed. Ore handling plants at both ends of navigation will also be put in condition for a heavy run of traffic, and some important orders in addition to those recently placed are expected to be let this spring. Practically all of these involve a great deal of hoisting, conveying and electrical machinery auxiliary to such plants, as well as yard locomotives, cars, special track material, &c.

As a whole the outlook for the next few months is very promising.

A large business is being done this season by the Pittsburgh Valve, Foundry & Construction Company, particularly in the Atwood specialties of its manufacture.

The Safety Cylinder Valve Company, Mansfield, Ohio, has also been experiencing a very active demand.

The Monongahela Natural Gas Company, Fredericktown, Pa., will add a small direct current generator to its electrical equipment.

The Vanadium Metals Company, Pittsburgh, has acquired another plant in the East, and will operate it particularly for the production of vanadium bronze.

The Pittsburg Metal Brazing Company, Pittsburgh, will install an induction motor generator set rated at about 75 hp.

The construction of a municipal pumping plant is projected at New Lexington, Ohio.

Considerable machinery will be required by the Emporium Lumber Company for its new flooring plant at Galeton, Pa., which takes the place of one recently destroyed by fire. Most of the equipment has, however, already been arranged for.

The Vanderstucken-Ewing Construction Company, Bethlehem, Pa., is having plans drawn for a fabricating plant about 50 x 200 ft., for which a full line of shears, punches,

drill presses, pneumatic appliances, &c., will be needed, together with electric motors for driving the machinery. An air compressor will also be among the company's requirements.

The Hancock Planing Mill & Lumber Company has been organized at Hagerstown, Md., to establish a woodworking plant.

A gas engine set and electric motors will probably be installed in the new factory of the National Mirror & Novelty Company at Massillon, Ohio.

A pumping unit for municipal service may be purchased this year at Silver Lake, Pa.

A combined hydroelectric, electric and steam power plant of 500 to 750 kw. capacity is said to have been determined upon by Thos. W. Brown for erection at Circleville, Ohio, where he has obtained a franchise from the municipal authorities. The details of the equipment are yet to be worked out.

A six-story factory, 60 x 180 ft., will be built at Parkersburg, W. Va., by the Graham-Bumgarner Company. Power and operating machinery will be required, although considerable equipment now in service can probably be utilized.

The Carnegie Steel Company is reported locally to have placed a contract with the Allegheny County Light Company, Pittsburgh, for electric current with which to operate motors in its warehouse at Twelfth and Pike streets, where upward of 500 hp. is needed to run motors, driving shears, punches, drills, saws, cranes and other apparatus.

The Kelley Axe Mfg. Company has been incorporated at Charleston, W. Va., to establish a plant for the manufacture of axes. No plans in relation to factory location and equipment have been announced.

The Pittsburg Hydro-Electric Company has engaged F. W. Scheidenhalm, Connellsville, Pa., to prepare drawings and specifications for the building and equipment of a large turbine driven electric power plant near Charleston, W. Va.

The foundry recently acquired at Verona, Pa., by the Standard Steel Car Company, Pittsburgh, is reported to be now in operation, and some additional apparatus suited to the present line of work there may be required in the near future.

The General Woodworking Company, Morgantown, W. Va., is putting up a large cabinet factory, which, it is said, will be equipped with modern machinery electrically operated. The necessary equipment has been purchased, but more will be needed later.

A boiler, Corliss or four-valve, engine, hoist, pneumatic appliances, &c., will be purchased by the East Side Utility Company, Powell, W. Va., for a new glass factory.

Plans are under way at Cumberland, Md., for the construction of water works with high duty pumping engines of large capacity. The details have not as yet, however, been definitely worked out.

The Crescent Forging Company, Oakmont, Pa., will install a number of large motors for direct current.

From Cumberland, Md., it is reported that the Williams Foundry & Machine Company of that place has had plans drawn for a foundry about 30 x 100 ft. and a machine shop of somewhat smaller dimensions. The details of the equipment required are not stated.

The New Era Auto Cycle Company, Dayton, Ohio, will need about 10 or 12 alternating current motors for driving tools in its shop.

The Borderland Coal Company, Borderland, W. Va., has decided to put in a compressor of moderate capacity which can be moved about.

The Western Pennsylvania Railway Company, Pittsburgh, Pa., which operates between McKeesport and Connellsville, as well as other points, is planning the erection of a new electric generating station and several subsidiary plants. This will mean one of the largest orders for machinery to be let during the season.

The Westinghouse companies are figuring with a large department and mail order store in Philadelphia on the installation of gas engines and generators, having an aggregate capacity of about 750 hp., marking a distinct departure in the equipment of private plants used for such purposes. If the plan is adopted producer gas will be used.

The Castalia Portland Cement Company, Vermillion, Ohio, with office in Pittsburgh, is arranging to install new pulverizing, clinkering and finishing machinery which will increase the capacity of its plant nearly 40 per cent. Most of the equipment needed is understood to have been purchased, but more may be required during the spring.

Among the requirements of the new shops to be erected at Greenville, Pa., by the Bessemer & Lake Erie Railway will be engine driven generating units aggregating about 750 kw., together with motors for driving the machinery in the plant.

A boiler, engine, generator and other apparatus for factory lighting are being installed by the Universal Pottery Company, New Castle, Pa.

Machinery with which to operate its mine and head works by electricity is to be installed this spring by the Haywood Coal Mining Company, Fairmont, W. Va. A new hoist is also needed.

Pacific Coast Machinery Market.

TACOMA, WASH., March 10, 1910.

Confirmation of the favorable conditions of trade noted in recent reports from San Francisco and Seattle is to be found in Tacoma, where all of the local manufacturers and supply men have their hands full both with inquiries and bookings. The last to give evidence of the renewed activity have been the shops of the Northern Pacific Railway at South Tacoma; but, beginning with the present month, about 400 machinists, boilermakers, blacksmiths and repair men have been put on a 10-hour daily basis, and there is a large amount of work waiting to be done.

A new plant for the construction of tanks, wood pile, &c., in which about 2000 tons of steel will be used yearly for banding the staves, has been nearly completed by the National Wood Pipe Company, Portland, Ore. Large contracts for two trans-continental roads are now in hand, and orders from hydroelectric power development companies are alone sufficient to keep the plant running for some time.

The Samson Iron Works, Stockton, Cal., has arranged with the Loggers & Contractors' Machinery Company, Portland, Ore., to handle its line of gasoline engines, both for stationary plants and marine service.

A pumping plant of larger capacity than any now in service will be required shortly for the Homestead Mine, at Searchlight, Nev.

The County Commissioners, Everett, Wash., recently decided to install a rock crushing plant of larger capacity than that now in service.

The Northern California Power Company is pushing work on its huge hydroelectric development at Inskip, Cal. The initial equipment was purchased some time ago and will soon be installed.

The Seattle-Tacoma Power Company, Tacoma, Wash., is operating a large compressor outfit, electrically driven, in connection with work on the enlargement of its Snoqualmie Falls plant, for which a quantity of new material and machinery will be required as the diverting tunnels near completion.

From Sacramento, Cal., it is reported that the Petroleum Iron Works Company, whose address is not stated, has filed articles of incorporation for the purpose of engaging in the manufacture of boilers, tanks, iron plate and structural work, &c.; also machinery of various kinds.

A number of motors for alternating current will be added to the driving machinery of the Golden State Portland Cement Company's works at Oro Grande, Cal.

A steam pumping unit is to be purchased this year by R. H. Parsons for installation at Creswell, Ore., where the City Council has granted him a franchise for water works.

The La Mesa Springs Lumber Company, La Mesa, Cal., is completing a woodworking plant which will be driven by gasoline engines.

The General Appliance Mfg. Company, Los Angeles, Cal., has been incorporated to establish a plant for the production of industrial machinery.

From Port Angeles, Wash., it is reported that the Port Angeles Power & Electric Company is in the market for electric generating machinery, transformers, switchboard, &c.

The American Gas & Electric Power Company has had plans drawn for a turbine power station of large capacity, to be erected at Georgetown, Wash., or in that vicinity. Whether steam or hydraulic is not stated.

A new engine is being installed in the old Dean mill of the C. A. Smith Lumber & Mfg. Company, on Coos Bay, at Marshfield, Ore., and the plan as remodeled will be run as an auxiliary to the main mill.

A machinery shop for repair and emergency work has been equipped by the Washington Machinery Depot, Tacoma, Wash., at the rear of their large warehouse, and it is probable from the present outlook that this branch of the business will need to be extended.

The Risdon Iron Works, San Francisco, has sold considerable mining and dredging machinery for use in the Philippines and other parts of the Orient, where its trade is being steadily developed.

The Pacific Coast Power Company, Seattle, Wash., has decided upon plans which involve the expenditure of over $2,000,000, resulting in the generation and distribution, continuously, of about 25,000 hp. The initial development project to be undertaken will be the building of a hydroelectric plant at Lake Tapps, in Pierce County, Wash. Some months later on large contracts for machinery will be placed, and the matter is worth following up during the interval.

W. H. Metson and P. O. Chappelle, who control a hydroelectric power site at Minden, Nev., are arranging for the installation of machinery, consisting of a 1500-kw., 2200-volt, three-phase, 60-cycle alternating current generator, direct connected to a hydraulic turbine; a 65-kw. exciter set, motor driven, and one of the same size operated by an impulse wheel; also six 200-kw. oil filled self-cooled transformers for raising current from 2200 to 55,000 volts.

The Platt Iron Works, Dayton, Ohio, has placed F. G.

Decker in charge of its San Francisco office, and Allis-Chalmers Company's interests there, as well as at Los Angeles, will hereafter be under the management of W. S. Heger, formerly assistant to the president of the company at West Allis, Wis.

The Vallejo Traction Company has been organized at Napa, Cal., by H. M. Meacham and others, to build an electric railroad to White Sulphur Springs.

The Comstock Pumping Association, Virginia City, Nev., will install a number of large alternating current motors.

The Kelman Electric & Mfg. Company, Los Angeles, Cal., is putting out a line of high tension oil switches and circuit breakers for pressures up to 110,000 volts. This is one of the many evidences of the growing independence of the coast in all matters pertaining to power equipment.

The Superior Portland Cement Company, Seattle, Wash., will install in the power plant connected with its works a new electric generating unit of 400 hp., together with exciter and other apparatus.

The Fullerton & Richfield Company, Fullerton, Cal., has been organized to build an electric traction line between that place and Richfield. The matter of erecting a power plant is yet to be decided upon.

A large hydroelectric power development, with turbines and dynamos for 10,000 hp. as the initial equipment, is to be undertaken at Le Pray, on the Spokane River, by the Spokane Railway & Power Company, Spokane, Wash.

The Union Iron Works, Los Angeles, Cal., will be engaged this spring on a contract for the equipment of the new pumping plant at Redondo Beach.

The Western Iron Works, Seattle, Wash., recently incorporated at $30,000, is preparing plans for a new shop, 50 x 80 ft., to be erected at 3909 Ninth avenue, in that city. The new shop when completed will be equipped with a traveling crane and necessary machinery for handling structural and ornamental iron work, mining buckets, cars, conveyors, blocks, hoists, derricks, tanks and several other lines. None of the equipment to be installed has been purchased.

The Henry & Brown Motor Company, Los Angeles, Cal., incorporated with a paid in capital of $12,000, is negotiating for a location on Grand avenue, upon which it will erect a garage.

The People's Electric Light & Power Company, Oakland, Cal., has filed with the County Clerk notice of its intention to incur an original bonded indebtedness of $250,000, the purpose of the bond issue being to carry out the project of the company to erect a central power plant and build transmission lines for electric power.

Southern Machinery Market.

CHATTANOOGA, TENN., March 14, 1910.

In connection with the great activity shown by industries that have been long established in this section, as noted in recent reports to *The Iron Age* from Birmingham, Nashville and other cities of the Southern States, the feature of greatest significance to the machinery trade of the entire country south of the Ohio is the steady influx of outside capital and the building of new manufacturing plants, either as the result of independent investment, or to be operated as branches of concerns whose headquarters are located elsewhere. Apart from the textile mills, whose increase has been phenomenal, woodworking plants of various kinds, including planing mills, handle factories, furniture plants, &c., predominate in the new industries of the cities and towns, but foundries, boiler and tank works, engine and electrical machinery plants, auto-vehicle building or assembling establishments and machine shops in considerable variety are being put up weekly. Some of these, in fact, represent absolute removals from locations long held in Eastern or Central Northern points and bring a certain amount of trade with them. The last named, together with branches built by Northern manufacturers, are of especial importance to the continued growth of the Southern States, for the reason that many superintendents, foremen and skilled workmen are induced to migrate also, and these constitute a vigorous, wholesome force the extent of which is yet to be appreciated. Its effects are, however, already visible to the trained observer. The writer of this report personally knows many ambitious men from Northern plants who have taken firm root in their new locations and have accomplished much more than they would ever have been able to under the more rigid, didactic methods of the older, larger shops, for the reason that their initiative and native ability have been given freer play. With these men the progressive Southern element, particularly those who have had the advantage of good technical training, are working hand in hand to the benefit of all concerned.

The Chattanooga & Tennessee River Power Company, which is completing a large turbine driven power plant on the Tennessee River, will furnish electrical energy with which to operate new electric furnaces, probably of the type offered in this country by the American Electric Furnace Company, at a plant to be established by the Southern Steel Casting Company, Chattanooga, Tenn., for the production of high grade castings. The product will be especially intended for parts subject to excessive vibration or shock, where good anti-fatigue properties are important. The plans of the new foundry concern have not yet, however, been fully matured, as its organization was only recently effected.

A system of mechanical stoking will be installed before long at the power house of the Chattanooga Railway & Light Company, and other improvements made in the plant. A large Corliss engine unit was recently added to the electric generating equipment.

Among the busiest works in the South at this time are those of the Casey & Hedges Mfg. Company, whose boilers in particular have been in extensive demand. Other products of Chattanooga shops for which inquiries and orders continue large are the industrial cars, mining equipments, &c., of the Gustafson Mfg. Company and castings, wagon skeins, &c., of the Southern Skein & Foundry Company.

The Oliver Electric Power Company, Oliver, Ga., is having plans completed for a generating plant of about 500 hp. capacity. The equipment details have not been finally decided upon.

The Butler-Hollingsworth-Martin Company, Gadsworth, Ala., will be in the market for power and cutting machinery, unless an outfit previously in service can be utilized, as it contemplates the erection of a plant at Howelton, Ala.

Tucker & Laxton of Charlotte have taken the contract to build a power and lighting station for Albemarle, N. C.

Charles and Curtis Long, Marshville, N. C., in association with G. M. Tucker, will establish a timber sawing plant. A boiler, Corliss engine, cutting and planing machinery have already been purchased, but more will probably be needed by fall.

The Pierce Phosphate Company, Palmetto, Fla., is installing an alternating current generator of 800 kw. capacity in its new electric power station at Pierce, Fla. This will be driven by a producer gas engine of 1150 hp. The older plant, which will be continued in service, contains Bullock generators and Diesel oil engines.

A report from Louisville, Ky., states that plans are now on foot for building an electric railroad from Glasgow to Hodgenville, Ky., under the style of the Louisville, Lincoln Farm & Mammoth Cave Traction Company. A large turbine power station is to be erected.

The Carolina Light & Power Company, Raleigh, N. C., has decided upon largely extending the capacity of its generating system. Plans to that end are now being worked out, but machinery requirements are not understood to have been as yet determined upon, and it may be some time before any purchases of new equipment are necessary.

An electric power and lighting station to be operated by the city is projected at Dechard, Tenn. The use of gas producer and gas engine, with dynamo, has been proposed.

Contracts for building the plant of the Veitch-Mathews Engine Company at Bessemer, Ala., are stated to be still unlet.

The municipal officials at Roanoke, Ala., whose plans were recently mentioned in *The Iron Age*, have decided upon the purchase of an alternating current generator, two-phase, 60 cycles, to deliver 150 kw. at a terminal pressure of 2300 volts, also two motors of 25 hp. each. Additional equipment for the power and pumping station will be purchased later.

An electric generating and refrigerating plant is to be installed at Henning, Tenn., by the Henning Electric Light & Ice Company.

New pumping machinery may be bought within the next three or four months by the city of Ashboro, N. C., where extensive improvements to the water service system are contemplated.

A report from Florence, S. C., which has not been confirmed, is to the effect that the Black Creek Power Company of that place has had plans drawn for a hydroelectric plant of 2800 kw. capacity.

A modern factory, electrically operated, is to be built at Birmingham, Ala., by the Davis Piano & Player Company, recently organized there. Machinery requirements have not yet been considered in detail.

A decision will be reached this month at Franklin, N. C., as to whether or not a pumping plant is to be erected there by the municipality. If the present project falls through a franchise will probably be tendered some private water works company.

The E. S. Mansfield Tool Company has been incorporated at Atlanta, Ga., to establish a plant for the manufacture of a specialty connected with the production of typewriters.

Funds for the construction of water works have been provided at Edison, Ga., and bids on one or more pumping units will be taken shortly.

Kenneth S. Finch, Charlotte, N. C., has organized a company for the construction of a large hydraulic power plant on the Broad River, the output from which is to be

used for industrial and electric traction purposes. No authentic details in relation to the project are obtainable at this time.

M. R. Welch, Jellico, Tenn., is reported to be in the market for a boiler, engine and operating machinery for a new stave factory. Confirmation of the details has not been received.

J. M. Simmons, Marshallville, Ga., has had plans drawn for an electric power and pumping plant to be operated in connection with the factory of the Elberta Crate Company.

If issue of bonds for the purpose is authorized, a municipal lighting station is to be built at Trenton, Tenn., and an engine and dynamo, switchboard, &c., installed.

The construction of water works has been authorized at Appalachia, Va., and purchase of equipment will be made before long.

The Smith-Courtney Company, Richmond, Va., has sold a large ballast plant for use by one of the Southern railroads, consisting of a gyratory rock breaker, elevator, revolving screen and motive power equipment.

The Southern Railway Company has purchased the plant of the Lenoir City Car Works, and also the brass foundry and machine shops, at Lenoir City, Tenn. Several needed improvements will be made and cars for the Southern system constructed there.

The city of Rockhill, S. C., has issued $285,000 light, water and sewerage bonds, and an electric light plant, as well as water works system, will be installed. John T. Roddy is Mayor.

About $3500 worth of machine tools are being purchased by the Public Belt Commission, New Orleans, La. Frank H. Joubert is secretary.

Southwestern Machinery Market.

KANSAS, CITY, MO., March 14, 1910.

From Kansas City to the New Mexico State line trade conditions are about as recently reported; if anything, inquiries have increased in volume.

The farther Southwest, however, deserves particular mention, as it is contributing more largely this year to the maintenance of the general machinery market than in any previous season. Most of the larger producers among the mining and smelting companies of that section were in steady operation during the year past, when Northern plants were closed, and, without exception, they are preparing for a heavier output. Less dependence is also to be made upon Eastern manufacturers for ordinary machine and forge work, repair parts, &c. This desideratum will to some extent be brought about by promises of business sufficient to encourage the establishment of iron and steel working shops in some of the more populous territorial centers, as well as directly at such places as Globe and Bisbee; but purchases of machine tools, forging outfits and boiler shop equipment will also be made for the account of the various companies themselves in larger volume than ever before.

Great activity has prevailed recently in building or laying out plants for generating electricity, the use of which is reducing operating costs, and more money is being put into pumping units capable of showing higher economy than the Cornish pumps or direct acting machines heretofore generally employed.

All of this, taken in connection with the need of machinery peculiar to mining, smelting, refining, &c., and the fact that the cities and towns of the territories are requiring more and more equipment for public service stations, creates a market decidedly worth cultivating. It is, however, a noteworthy fact, that the bulk of the business has thus far been divided among a relatively small number of Eastern firms.

The Smith Automobile Company, Topeka, Kan., will not remove to Grand Rapids, Mich., as has been recently reported, but has decided to remain in the West, where some addition to its present manufacturing facilities will undoubtedly be provided before autumn. The plant now occupied may be enlarged or a new one built; no authoritative announcements on that score have as yet been made.

From Little Rock, Ark., it is reported that a logging railroad may be built this year by Arnold Raines & Co. of that city.

P. H. Manaker, Alvin, Texas, may be in the market shortly for an engine and dynamo.

The Squire Electrical Construction Company, Kansas City, has contract for the erection of a municipal power and pumping station at Ashland, Kan.

Considerable local pride is taken in the fact that the contract for the 15,000,000 gal. pumping engine for the Quindaro station of the Kansas City water works has been awarded to the Strait Mfg. Company of this place, being one of the first large orders for pumping machinery placed with any concern west of the Mississippi River, except on the Coast.

The Electric Railway, Light & Ice Company, Junction City, Kan., is reported to be in the market for a motor generator set of 200 to 250 kw. capacity, with auxiliary apparatus, for operation on a three-phase, 60-cycle, 2200-volt circuit and to deliver direct current at 550 volts.

Construction of a pumping plant and water works system will be undertaken this spring by the city of Jacksboro, Texas.

The Demorest Mfg. Company, Enid, Okla., which is sole manufacturer of the New State concrete mixers in Kansas, Arkansas, Oklahoma, Texas, Arizona and New Mexico, will be obliged at the present rate of orders to enlarge its shop facilities.

The Little Rock Handle Company, Chas. McKee, president, has organized with $50,000 capital, for the purpose of manufacturing all edge tool and hammer handles. Work on a building is to begin at once and the purchase of machinery will be completed shortly.

Equipment for a pumping station will probably be contracted for this spring at Tulsa, Okla.

The 500-ton plant of the Hercules Mining Company, near Joplin, Mo., has been completed. Some additional machinery and other apparatus will, however, be needed later on.

The O'Neill Engineering Company, Dallas, Texas, has been intrusted with the preparation of plans for a pump house and system of water supply at Olustee, Okla.

A new box factory, equipped with power and woodworking machinery, will be erected before long by the Inman Box Company, Kansas City, on a site recently acquired.

Purchase of machinery for an electric power plant to be operated by the city will be made within the coming month at Durant, Okla.

The Brady Water & Light Company, Brady, Texas, is about to add to its plant an electric generating unit of about 75 kw., gas or gasoline engine driven, together with refrigerating machinery, to be run on the day load.

Boilers and steam pumps are needed for water works extension at Floresville, Texas.

Equipment for a logging railroad 15 miles long will be required in the near future, according to a report from Letona, Ark., by the Doniphan Lumber Company.

The Boonville Light & Water Company, Boonville, Ark., contemplates the installation of hydraulic turbines for driving generators and pumps.

Purchase of a 50-kw. dynamo, direct connected to an automatic high speed engine, is being considered at Kiowa, Kan., for the city power station.

New pumping machinery for high duty service will probably be required before fall by the San Angelo Water Company, San Angelo, Texas, which has provided funds with which to make extensive improvements.

An electric lighting system is to be installed at Fairview, Kan., and the authorities may also arrange for industrial power service.

The capacity of the W. K. Henderson Iron Works & Supply Company, Shreveport, La., has been more than doubled as a result of plant extensions and the installation of improved machinery. Orders for iron castings have been particularly plentiful of late, and the capacity of the new foundry is taxed to the utmost, but with the modern equipment now used it is possible to take care of all business promptly.

An additional pumping unit may be purchased this spring for the water works at Weimar, Texas.

The Union Central Light & Ice Company, Hubbard City, Texas, contemplates installing a water tube boiler of 350 to 400 hp. capacity and an electric generating unit having a normal output of 75 kw. to deliver direct current at 220 volts.

The Osage Foundry & Machine Company has been incorporated to operate a metal working establishment at Bartlesville, Okla.

The Southwestern Iron Works, now located at Gainesville, Texas, whose plans were referred to some time ago in *The Iron Age*, is completing a plant at Oklahoma City, Okla., which is expected to be running about May 1 or sooner. Most of the equipment needed has been provided for.

A complete power plant will be installed by the Michigan-Arkansas Lumber Company, at Bettleton, Ark., in connection with its new mill, which is to be of unusually substantial construction, with steel roof trusses. The principal features of the equipment have been contracted for, but some auxiliary apparatus will be needed later.

The Southwestern States Portland Cement Company, Dallas, Wis., will extend its plant by the addition of cement making machinery and another large gas engine and generator, with producers. Some orders for machinery have already been placed.

Power and refrigerating units will be installed some time this year by the Malone Light & Ice Company, Plainview, Texas.

Tools for repair work, with motors and other apparatus, will be needed before long by the Citizens' Railway Com-

pany, Waco, Texas, for a new shop to be erected in connection with car barns.

Some additional machinery will be installed by the Griswold Pencil Company, Cotter, Ark., in an extension of its factory.

W. T. Pittman, Fort Worth, Texas, is reported to be in the market for refrigerating machine to be operated in connection with an electric power plant which he controls.

An air compressor is to be bought shortly by the Webb City & Carterville Water Company, Webb City, Mo.

A new saw mill, requiring power and operating machinery, will be erected at Winnfield, La., by the Linn Lumber Company, which now has a planing mill there.

A Corliss or high speed engine will probably be required in the near future for the municipal power plant at Lincoln, Kan.

A pumping plant will be built at McGehee, Ark., and a complete system of water works installed.

The Peavy-Byrnes Lumber Company, Shreveport, La., whose plans for a new mill were recently mentioned in *The Iron Age*, has let the contract for engines and saw mill machinery to the Lufkin Foundry & Machinery Company, Lufkin, Texas.

John E. Cox, Van Horn, Texas, is reported to be in the market for an engine, dynamo, boiler, pump and switchboard, but this has not been confirmed.

The Cheek Automatic Switch Throw Company has been incorporated at Little Rock, Ark., to manufacture a patented railroad specialty.

The Logan Lumber Company, Mansfield, La., is planning to erect a timber cutting plant.

The Farmers' Wire Fence Company will build a large factory in the vicinity of Oklahoma City, Okla. Equipment has not yet been purchased, so far as can be learned locally. This industry was secured for the city through the Chamber of Commerce, the secretary of which will be in a position to answer inquiries concerning it.

L. W. Lewis, a contractor of Emporia, Kan., largely engaged in railroad work, is preparing to set up another crushing plant, consisting of a large gryatory breaker, elevator, conveyor, revolving screen and power for driving them. The machinery is understood to have been already contracted for.

T. J. Wood and C. T. Barrymore of Oklahoma City, Okla., have incorporated at Santa Fe, N. M., the Levisa Creek Coal, Coke & Power Company, for the operation of mines, ovens and electric plants.

Bonds for $18,000 will be issued by the city of Winnesboro, Texas, to provide funds for the construction of a pumping plant and system of water distribution.

An engine, dynamo and ice making machinery will be required for a plant to be operated by the Snyder Electric & Ice Company, Snyder, Texas.

The Enterprise Mining Company, Kingman, Ariz., is planning the erection of a 50-ton concentrating plant.

Construction of a hydroelectric power station, with auxiliary steam units, transformers, &c., is proposed for the city of Phœnix, Ariz. Realization of the project is, however, some time distant.

The contract for steel water tanks at the territorial prison, Tombstone, Ariz., has been awarded to the Des Moines Bridge & Iron Works, Des Moines, Iowa.

The Gila River Power Company has been organized at Silver City, N. M., to undertake an extensive hydroelectric power development on the Gila River.

The Sigma Development Company, Hillsboro, N. M., will probably install a larger hoisting engine.

The new power plant of the Miami Copper Company, Globe, Ariz., which will contain boilers, heaters, superheaters, economizers, pumps, condensers, engines, generators, control apparatus, &c., for a capacity of nearly 5000 hp., is nearing completion. A large Corliss air compressor is also to be installed. All of the equipment has been provided for, but more is to be required later, as the plans include furnishing power for the concentrating plant, for the mine pumps, for operating and tramming on the various levels and for a very thorough system of lighting and pneumatic service in and about the property. The company also purchased for its smelter four traveling cranes, one of 5 hp. and three of 15 hp.

The Motor & Machinists Supply Company, Kansas City, Mo., has been incorporated with capital stock of $50,000, to do a jobbing business in automobile supplies, mechanical goods, &c. W. J. Stowe is president of the company.

The O'Neil Engineering Company, Dallas, Texas, has prepared plans for water works system at Mountain View, Okla. The city will bore for artesian water before purchasing the machinery plant. If a sufficient supply is not obtained water will be drawn from a nearby stream, which will call for a change in the equipment, and it may be 30 days before a definite decision as to requirements can be made.

The plans of the St. Louis & San Francisco Railroad Company for enlarging its shops at Sapulpa, Okla., have not yet been announced, but it is understood definite action will be taken at an early date.

Western Machinery Market.

DES MOINES, IOWA, March 14, 1910.

The machinery trade in this section has been strengthened in tone by the action of the principal railroads traversing Iowa, Nebraska and northern Missouri, in ordering extensive betterments at the various division headquarters and terminals. These include purchase of tools for repair work, elevated tanks, pumps, motors, lighting sets, roundhouse frames and equipment, air compressors and other apparatus generally used at such points, including signal appliances. All of the buying has been done in small lots, and it has not attracted much attention, but the stimulus of it is felt in many directions. Electric railways and power companies are also contributing heavily to the present activity. Other buyers whose orders lately have been appreciable factors in the situation are small local foundries and repair shops, owners of ballast, macadam and crushed stone plants, lime and cement manufacturers and general contractors, while cities, towns and villages continue to place contracts for power and pumping units.

The Waterloo Malleable Iron Works, Waterloo, Iowa, has been incorporated with a capital stock of $100,000, and is preparing to do a large business during the present year.

The Burlington Railroad will probably enter this season upon extensive improvements at Tracy, Iowa, including the erection of a large steel water tank, roundhouse and repair equipment.

Plans for the improvement of the water works system at Waterloo, Iowa, include the purchase of two horizontal pumping engines of the crank and flywheel type, each having a capacity of 4,000,000 gal. per 24 hours, the present machinery to be kept in service as emergency equipment.

The construction of a pumping station by the municipality is under consideration at Bunnell, Iowa.

Plans for a lighting plant at Pocahontas, Iowa, have been entrusted by the authorities to Oscar Claussen, St. Paul, Minn.

The Iowa City Gas & Electric Company, Iowa City, Iowa, has decided upon the installation of an alternating current generator of 500 kw., driven by hydraulic turbine, with exciting unit, switchboard, transformers, &c.

The Nauman Company, Waterloo, Iowa, is having plans drawn for a large addition to its factory. Some power equipment and additional woodworking machinery will probably be called for.

The Marengo Electric Light & Power Company, Marengo, Iowa, which was recently organized, will be in the market for an engine, dynamo and other apparatus with which to equip a power and lighting plant. A gas producer may be installed in preference to boilers and choice of a prime mover made accordingly.

The Dodge Corrugated Iron Company is reported to have determined upon an extensive addition to its plant in Sioux City, Iowa, the Great Northern Railroad Company having vacated ground for the purpose of giving the necessary room.

Purchase of machinery for an electric power and pumping plant will be considered shortly at Pella, Iowa, where funds for the purpose are now being provided.

The Southern Iowa Traction Company will enter upon extensive improvements, including the probable erection of a large power plant at Centerville, Iowa, with substations. No definite plans have as yet, however, been published, and for authentic information inquiry should be made directly to the company.

The King Foundry Company, Nebraska City, Neb., which makes a specialty of high grade castings for bronze, brass, aluminum and semi-steel parts used in automobile construction, as well as ordinary gray iron castings, will be obliged to materially extend its production during the present year. An addition to the plant may be built in the fall, although no definite announcement of it has been made.

The Joplin Water Works Company, Joplin, Mo., is preparing to increase the capacity of its pumping station. New equipment is understood locally to have been arranged for.

A Corliss engine of 150 to 200 hp. will be added to the power equipment of the Link Milling Company, Springfield, Mo., together with other machinery. The purchase has not yet been made.

A new tubular boiler will be purchased for the municipal power station at West Point, Neb.

The Anamosa Electric Light & Power Company, Anamosa, Iowa, will be in the market before long for additional machinery.

Plans are being made at David City, Neb., for the proposed power and pumping plant to be operated by the city, funds for the construction of which were recently provided.

The Florence Iron Works, Florence, Colo., has been awarded contract for the excavation of wells and equipment of a pumping station to be used in irrigation work at points in Kiowa County.

The Citizens' Railway & Light Company at Muscatine, Iowa, has recently added a 750-kw. Westinghouse turbo-generator set for its local light, power and railway service. A rotary converter set makes available direct current for the latter purposes. The condensing system is of the Leblanc jet type, manufactured by the Westinghouse Machine Company, East Pittsburgh, Pa.

A factory for the manufacture of automobile bodies, which will be the only one of its kind in this territory, will be established at Salt Lake City, Utah, by P. R. Melchert of that place and others. The construction and equipment are now being arranged for.

The Ogden Rapid Transit Company, Ogden, Utah, is preparing to enlarge its power facilities by the installation of a new generating unit with output of about 500 hp., with switchboard and control instruments, &c.

Extensive improvements, involving the purchase of considerable additional apparatus, will be made in the water works system at Caldwell, Idaho, which is operated by the city.

Some machine tools, motors, &c., with possibly an independent power plant, will probably be needed this summer by the Pullman Company, Chicago, for repair shops to be built at Denver, Colo.

The authorities at Price, Utah, are planning the installation of an electric power and lighting plant, the equipment for which has not yet been provided.

The Denver Engineering Works is filling an order for machinery to be installed by the Magistral Ameca Company, in which Jas. P. Harvey of Los Angeles, Cal., is interested. This includes two boilers of 160 hp., a tandem compound engine, concentrating equipment, ore cars, &c. The works are at Jalisco, Mexico.

The San Pedro, Los Angeles & Salt Lake Railroad Company will install at Las Vegas, Nev., a 100-kw. motor generator set and other electrical apparatus.

The city of Idaho Falls, Idaho, has engaged an engineer to prepare plans for a modern system of water works.

The H. M. Byllesby Company, Chicago, has acquired control of electric plants at Idaho Falls, Rexburg and St. Anthony, Idaho, which it will improve and enlarge, with consequent probable purchase of considerable machinery in the near future.

The city of Madison, Neb., will receive bids until April 6 for the following: One motor driven pump, 150 gal. per minute capacity at 20 to 25 revolutions of crank; one 250-volt direct current 15-hp. motor; one horizontal tubular steam boiler, 72 in. by 16 ft. F. J. Dankers is City Clerk.

The St. Joseph's Hospital Association, Denver, Colo., is having plans prepared for a power house and laundry to be erected at a cost of about $15,000.

John G. Woodward & Co., Council Bluffs, Iowa, has broken ground for an addition to its factory, 70 x 142 ft., five stories, mill construction, which will be equipped with two freight elevators run by electric power. The company will also erect a new power plant which will be equipped with boilers, engine, dynamos, &c.

Detroit Machinery Market.

DETROIT, MICH., March 15, 1910.

Business thus far this month has not entirely fulfilled the expectations of the builders of machine tools and general shop and factory equipment located in the territory surrounding Detroit, but many believe that the latter part of March will bring out lists of considerable size for the account of automobile plants, railroad shops and manufacturers of heavy industrial machinery, as new construction work at various points has reached the stage where the closing of contracts will be essential before long if the purchasers hope to arrange for reasonably prompt deliveries. In respect to the last named conditions have materially improved, due to the recent cessation of extensive buying, and some tool builders are now prepared to offer better terms of shipment than they have been able to for some months past. The limit of weekly production has also been raised to a much higher point than heretofore, as a result of the constant effort to extend or get more out of manufacturing facilities at the plants of these same builders; for, strange to say, they have been following some of their own suggestions to customers, and an aggregate of business at least 20 per cent. greater than it was possible to handle a year ago can now be safely taken. In the case of some shops the increase in facilities is, of course, very much more.

The Anderson Forge & Machine Company, Detroit, is having plans drawn for two shops, 65 x 260 ft. each, one 65 x 220 ft., one 65 x 337 ft. and one 80 x 175 ft., the last named to be used partly for storage of material; also a finishing plant, 65 x 320 ft., two stories, and other smaller buildings, including a central power plant of 1200 hp. capacity. Bids on the necessary equipment will soon be taken. The installation of two steam hammers of 100 tons capacity each is said to be contemplated.

Two boilers of 200 hp. capacity, with power machinery, will be provided for the new plant of the Sommers Match Company, Saginaw, Mich., the preliminary plans for which were mentioned in *The Iron Age*. Bids on the power house construction are now being taken.

The Oliver Chilled Plow Works will erect a three-story addition to its plant, to be used primarily for assembling and storage.

The Climax Specialty Company, Seneca Falls, New York, is reported to be actively preparing for the erection of a foundry and shops at Ann Arbor, Mich., the largest of which will be 60 x 400 ft. It is understood that the equipment details have not yet been fully worked out.

A combined gravity and mechanical filtration plant, to cost $500,000, may be installed within the coming year by the city of Grand Rapids, Mich. If this work is decided upon it will mean the purchase of considerable apparatus. One of the most modern plants of a similar character now in operation is that which was erected at Columbus, Ohio.

The Universal Machine Company, Albion, Mich., is said to contemplate building a plant at Saginaw, Mich.

The Detroit Sulphite Pulp & Paper Company, Detroit, is adding to its electrical equipment.

Preparations are understood to have been nearly completed for the removal of the Toledo Iron Works Company, Toledo, Ohio, to a new location at Evansville, Ind. Nothing has yet, however, been definitely given out on the subject of additional equipment. If the plans reported are fully carried out, a good many new tools, with motors for operating them, and the installation of a power plant of large capacity, will be required.

The Huron Auto Body Company will put in operation at Port Huron, Mich., a new plant for the manufacture of the specialty mentioned. Present needs in the way of machinery have been provided for.

A Corliss engine of 200 hp. is being installed in the factory of Innes, Pearce & Co., Rushville, Ind., together with other machinery. Some additional apparatus is likely to be required by fall.

Installation of a mechanical filtration plant is being considered by the city officials at Ligonier, Ind.

The Kaufman Vehicle Mfg. Company, which has succeeded to the business of the Kaufman Buggy Company at Miamisburg, Ohio, may enlarge its facilities considerably and enter upon the manufacture of automobiles in addition to its regular line. This report, however, is not confirmed.

Two tubular boilers having an aggregate capacity of 250 to 300 hp. are needed for the municipal power and pumping station at Attica, Ind., of which Geo. McDonald is superintendent.

A new battery of boilers will be purchased shortly for the municipal water works at Peru, Ind.

Plans for a power and lighting station have been ordered drawn by the city authorities at New Concord, Ohio, where the project will probably be put through this year.

The Glass Enameled Package Company, Detroit, Mich., recently incorporated and capitalized at $600,000, has purchased 5 acres of land at Gratiot road and the Belt Line in that city, where it will build and equip a manufacturing plant. Henry C. Wiedman, 948 Beaufait avenue, Detroit, is manager of the company.

The E. M. F. Company, Detroit, Mich., manufacturer of automobiles, is arranging to erect a large addition to its plant on Piquette avenue in that city.

The National Fulton Brass Mfg. Company, Detroit, Mich., has purchased land in that city upon which it will erect and equip a manufacturing plant at a cost of about $100,000.

The Whistler Mfg. Company, Wyandotte, Mich., manufacturer of auto parts, is erecting a new factory building, 80 x 200 ft.

The Buick Motor Company, Flint, Mich., is erecting a large addition in which it will install two of its branch factories, one of which is now located in Chicago.

The Metzger Motor Car Company, recently incorporated at Detroit, with capital stock of $1,000,000, for the manufacture of commercial trucks and automobiles, is having plans prepared for a large plant.

Northwestern Machinery Market.

DULUTH, MINN., March 14, 1910.

It is stated locally that 53,000,000 tons of iron ore have been ordered shipped from the ranges to Eastern blast furnaces during the present season. Whether this approximates the true quantity or not, it is certain that great activity prevails in every district at or adjacent to the head of the lakes, and extraordinary preparations for mining ore, providing transportation to vessels and handling it across the docks are now being made. All of this inures to the benefit of the machinery trade, and, while the bulk of the new equipment comes from the South and East, local plants are also kept busy supplying what they can. Among these the National Iron Works and Clyde Iron Works, both located at Duluth, are particularly prominent, and it is reported here that each will find it necessary before the year is out to add to its manufacturing facilities.

Westward through Minnesota, the Dakotas, Montana and Idaho the machinery trade is in a flourishing condition, so far as the aggregate needs of the territory permit, and supply houses are kept reasonably busy, as indicated in *The Iron Age's* reports from Minneapolis recently published. A considerably larger volume of business is, however, anticipated when the railroads get to buying more freely. Meanwhile, local power and lighting companies, municipalities, quarries, contractors and manufacturing plants are giving the principal support to the market, with foundries and metal working establishments a constantly increasing factor.

The Minneapolis Steel & Machinery Company, Minneapolis, has within the past few months taken a number of large contracts for the erection of steel frame ore reduction works, cement mills, hydroelectric stations, &c., and a constantly widening field of application is being found for the Muenzel gas producers and gas engines of its manufacture. Among the plants new being equipped is one at Milbank, S. D., said to be owned by Oscar Claussen, St. Paul, Minn., who is a consulting engineer.

Preparations are being made to provide electric power and lighting for the town of Marble, Minn., from the plant of the Oliver Iron Mining Company.

A large system of reservoirs and dams for the development of hydroelectric power in a turbine station is being planned by the Minnesota River Improvement & Power Company, recently organized at St. Paul. Equipment details are still undecided and probably will not be taken up until constructive work is well advanced, but a study of the operating conditions will repay intending bidders.

A gas engine driven or steam turbine power plant is to be erected shortly at Aberdeen, S. D., by the Aberdeen Street Railway Company. Contracts for machinery are to be considered in about six weeks.

The contract for erecting a steel tower and storage tank on Lowry Hill in Minneapolis has been awarded by the city to the Chicago Bridge & Iron Company.

A Corliss engine and dynamo of moderate capacity will be added to the present equipment of the municipal power and lighting station at Ortonville, Minn.

The city of Delano, Minn., has ordered from the Minneapolis Steel & Machinery Company an elevated steel water tank.

Some increase is to be made this year in the output of the power plant operated by the village of Biwabik, Minn.

Geo. Chrusler, Wadena, Minn., is arranging for the installation of an engine and generator of about 100 kw., having been granted a public service franchise to cover power and lighting.

The Consumers' Power Company, Stillwater, Minn., is planning the construction of a hydroelectric plant. It recently acquired the central station at Mankato and will extend its service to that city.

The plant of the Minneapolis General Electric Company at Taylors Falls is to be greatly enlarged. Definite plans have not yet been made, however, so far as the details of the turbines, generators, &c., required are concerned.

Power equipment, planing mill machinery and woodworking tools may be required shortly by the Great Falls Lumber Company, which is arranging for the construction of a new plant at Great Falls, Mont. Its dimensions will be about 50 x 150 ft.

Contracts are being closed by the Duluth, Missabe & Northern Railroad Company for the construction and equipment for its steel ore car repair shops at Proctor, Minn.

Excavation has been completed for the power house to be erected by the Minnesota Steel Company, Duluth, to furnish electric current for use in building operations. It is to be 44 x 100 ft., having concrete walls and steel truss roof, and will contain the following principal equipment: Two 400-hp. boilers, 500-kw. engine driven generating unit, and cross compound air compressor. The two last named have been ordered from the C. & G. Cooper Company and the Nordberg Mfg. Company, according to reports here.

In addition to other improvements recently determined upon, as reported in *The Iron Age*, the city of Marble, Minn., will purchase a steam pump and other equipment for the water works station.

A generating unit of about 150 to 175 hp., with exciter, switchboard, &c., for alternating current, and a number of induction motors, will be installed in the near future by the Aberdeen Lumber & Shingle Company, Aberdeen, Wash.

The project for a pumping plant at Dallas, S. D., has reached the stage where the purchase of machinery will be considered shortly by the municipal authorities.

A large order for structural iron and steel to be used on its elavated crossing at Proctor, Minn., has been given by the Duluth, Missabe & Northern Railway, Duluth, to the American Bridge Company.

A municipal power plant will probably be built this year at Owatonna, Minn.

The Peterson & Hoff Bros. Machine Company, Douglas, N. D., has been incorporated and capitalized at $25,000, the incorporators being: Wm. J. Peterson, Edwin Hoff, John L. Hoff.

A new company has been incorporated at Fergus Falls, Minn., by Joseph Bauer and others for the manufacture of a rotary ice cutting machine, which cuts 3000 to 5000 tons of ice in 10 hours with about 20 gal. of gasoline. The company has a machine shop fully equipped, but expects later on to erect a foundry and purchase necessary equipment.

B. F. Pitman, Chadron, Neb., is in the market for a stiff mud process brick machine with automatic cutter, and the necessary power equipment to drive it.

Government Purchases.

WASHINGTON, D. C., March 14, 1910.

The Paymaster General, Navy Department, Washington, D. C., will open bids March 29, under schedule 2283, for the following:

Two motor driven boring and turning mills, one cold metal sawing machine, eight sensitive bench drills.

Bids will be opened April 6 by C. J. Goodier, constructing quartermaster United States Army, Fort Hancock, N. J., for the construction of a pumping plant at that point.

The Bureau of Supplies and Accounts, Navy Department, Washington, will open bids April 12, schedule 2332, for nine pneumatic wire rope hoists; schedule 2329, for one oxy-acetylene welding and cutting plant.

Bids were opened by the Isthmian Canal Commission, March 7, for the following:

Class 1.—One frictional geared hoisting engine—Bidder 7, Charles Barnes Company, Cincinnati, Ohio, $760; 60, Lidgerwood Mfg. Company, New York, $425; 63, Manning, Maxwell & Moore, New York, $454.80; 70, Motley, Green & Co., New York, $490; 97, Stroudsburg Engine Works, Stroudsburg, Pa., $406; 108, Williamson Brothers Company, Philadelphia, Pa., $625.

Class 3.—Two horizontal duplex pumps—Bidder 13, George F. Blake Mfg. Company, New York, $296.30 and $312.30; 19, Buffalo Steam Pump Company, Buffalo, N. Y., $590; 34, Fairbanks, Morse & Co., Chicago, $850; 38, Fox Brothers & Co., New York, $544.94; 39, Gardner Governor Company, Quincy, Ill., $550; 47, Hall Steam Pump Company, Pittsburgh, Pa., $920; 63, Manning, Maxwell & Moore, New York, $503.50; 70, Motley, Green & Co., New York, $506.12, $692.66 and $437; 73, National Electrical Supply Company, Washington, D. C., $577.50; 82, Platt Iron Works, Dayton, Ohio, $513; 106, Vermilye & Power, New York, $490.

The Isthmian Canal Commission opened the following bids March 7 for one vertical fire tube boiler:

A. D. Granger Company, New York, $752; E. Keeler Company, Williamsport, Pa., $610; Kittoe Boiler & Tank Company, Canton, Ohio, $360; Manning, Maxwell & Moore, New York, $700; J. H. Murphy Iron Works, New Orleans, La., $657; Robert Mumford Boiler Company, South Farmington, Mass., $700.

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CURRENT METAL PRICES.

The following quotations are for small lots. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market report

IRON AND STEEL—

Bar Iron from store—

Refined Iron:
1 to 1 ⅝ in. round and square .. ₩ lb 1.90¢
1½ to 4 in. ⅝ to 1 in. ₩ lb 1.90¢
1 ½ to 4 in. x ⅛ to 5-16 ₩ lb 2.10¢
Rods—⅜ and ½-16 round and square ₩ lb 2.10¢

Angles: Cts ₩ lb
3 in. x ¼ in. and larger 2.10¢
3 in. x 3 16 in. and ¼ in. 2.35¢
1½ to 2½ in. x ¼ in. 2.20¢
1½ to 2½ in. x 3-16 in. and thicker 2.10¢
1 to 1¼ in. x 3-16 in. 2.20¢
1 to 1¼ x ⅛ in. 2.30¢
⅝ x ⅛ in. 2.40¢
¾ x ⅛ in. 2.50¢
⅝ x ⅛ in. 3.55¢
½ x 3-32 in. 4.35¢

Tees:
1 in 2.65¢
1¼ in. 2.45¢
1½ to 2½ x ¼ in. 2.15¢
1½ to 2½ x 3-16 in 2.35¢
3 in. and larger 2.15¢
Beams 2.10¢
Channels, 3 in. and larger 2.10¢
Bands—1½ to 6 x 3-16 to No. 8 2.35¢
"Burden's Best" Iron, base price 3.15¢
Burden's "H. B. & S." Iron, base price 2.95¢
Norway Bars 3.60¢

Merchant Steel from Store—

per lb
Bessemer Machinery 1.90¢
Toe Calk, Tire and Sleigh Shoe 2.50@3.00¢
Best Cast Steel, base price in small lots 7¢

Sheets from Store—

Black

	One Pass, C. R Soft Steel.	R. G Cleaned.
No. 16	₩ lb 2.90¢	3.00¢
Nos. 18 to 21	₩ lb 2.95¢	3.10¢
Nos. 22 and 24	₩ lb 3.05¢	3.20¢
No. 26	₩ lb 3.10¢	3.30¢
No. 28	₩ lb 3.20¢	3.50¢

Russia, Planished, &c.

Genuine Russia, according to assortment ₩ lb 12 @14½
Patent Planished, W. Dewees Wood, ₩ lb A, 10¢; B, 9¢ net.

Galvanized.

Nos 11 to 16 ₩ lb, 3.30¢
Nos. 22 to 24 ₩ lb, 3.55¢
No 26 ₩ lb, 3.75¢
No 28 ₩ lb, 4.10¢
No 29 and lighter 36 inches wide, 25¢ higher

Genuine Iron Sheets—Galvanized.

Nos. 22 and 24 ₩ lb ..5.75¢
No. 26 ₩ lb ..6.25¢
No. 28 ₩ lb ..7.25¢

Corrugated Roofing—

2½ in. corrugated.	Painted	Galvd.
No. 24	₩ 100 sq. ft. $3.85	4.80
No 26	₩ 100 sq. ft. 2.95	4.00
No. 28	₩ 100 sq. ft. 2.60	3.75

Tin Plates—

American Charcoal Plates (per box.)
"A.A.A." Charcoal:
IC, 14 x 20 $6.35
IX, 14 x 20 7.00
A. Charcoal.
IC, 14 x 20 $5.40
IX, 14 x 20 6.50

American Coke Plates—Bessemer—

IC, 14 x 20 107 lb $4.40
IX, 14 x 20 5.40

American Terne Plates—

IC, 20 x 28 with an 8 lb. coating $8.50
IX, 20 x 28 with an 8 lb coating 10.50

Bolts—

Carriage, Machine, &c.—

Common Carriage (cut thread):
⅜ x 6 and smaller 70&7½%
Larger and longer 65&5%
Common Carriage (rolled thread):
⅜ x 6, smaller and shorter 70&12½%
Phila. Eagle, $3.00 list 80&5@80&10%
Bolt ends with C. & T. Nuts 65&5%
Machine (Cut Thread):
⅜ x 4 and smaller 70&12½%
Larger and longer 65&10%

Nuts

Blank or Tapped.

	Off list.
Cold Punched	
Square	4.90¢
Hexagon	5.50¢
Square, C., T. & R.	5.30¢
Hexagon, C., T. & R.	6.10¢
Hot Pressed	
Square	5.40¢
Hexagon	5.80¢

Seamless Brass Tubes—

List November 13, 1908. Base price 18¢

Brass Tubes, Iron Pipe Sizes—

List November 13, 1908. Base price 18¢

Copper Tubes—

List November 13, 1908. Base price 22¢

Brazed Brass Tubes—

List August 1, 1908. 20½¢ ₩ lb

High Brass Rods—

List August 1, 1908. 15¼¢ ₩ lb

Roll and Sheet Brass—

List August 1, 1908. 15¼¢ ₩ lb

Brass Wire—

List August 1, 1908. 15¼¢ ₩ lb

Copper Wire—

Base Price, Carload lots mill 15¼¢

METALS—

Tin—

Straits Pig ₩ lb 37@37½¢

Copper—

Lake Ingot ₩ lb 14¾@15 ¢
Electrolytic ₩ lb 15 @15¼¢
Casting ₩ lb 14¼@14½¢
Sheet Copper Hot Rolled, 16 oz (quantity lots) ₩ lb 19 ¢
Sheet Copper Cold Rolled, 1¢ ₩ lb advance over Hot Rolled.
Sheet Copper Polished 20 in. wide and under 1¢ ₩ square foot.
Sheet Copper Polished over 20 in. wide, 2¢ ₩ square foot.
Planished Copper, 1¢ ₩ square foot more than Polished

Spelter—

Western ₩ lb 6¼@6¾¢

Zinc.

No 9, base, casks ₩ lb 8¼¢ f. Open ₩ lb 8¾¢

Lead.

American Pig ₩ lb 5¼@5¾¢
Bar ₩ lb 6¾@6¼¢

Solder.

½ & ½, guaranteed ₩ lb 23½@23¾¢
No. 1 ₩ lb 18¾@19¼¢
Refined ₩ lb 17¼@17¾¢
Prices of Solder indicated by private brand vary according to composition.

Antimony—

Cookson ₩ lb ..@10¢
Hallett's ..@10¢
Other Brands ..@9½¢

Bismuth—

Per lb $2.00@$2.25

Aluminum—

No. 1 Aluminum (guaranteed over 99% pure), in ingot for remelting 24¢
Rods & Wire Base Price 31¢
Sheets Base Price 33¢

Old Metals.

Dealers' Purchasing Prices Paid in New York

	Cents
Copper, Heavy cut and crucible	₩ lb 11.50@11.75
Copper, Bright and Wire	₩ lb 11.00@11.25
Copper, Light and Bottoms	₩ lb 10.00@10.25
Brass, Heavy	₩ lb 7.75@ 8.00
Brass, Light	₩ lb 6.25@ 6.50
Heavy Machine Composition	₩ lb 10.25@10.50
Clean Brass Turnings	₩ lb 7.25@ 7.50
Composition Turnings	₩ lb 8.00@ 8.75
Lead, Heavy	₩ lb ....@ 3.75
Lead, Tea	₩ lb ....@ 3.50
Zinc Scrap	₩ lb ..@ 4.00

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